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SAMPLE SWATCH QUARTERLY

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NEW YORK, APRIL 15, 1929

Testing Methods, Standards and Types for Determining the Fastness Properties of Dyeings on Cotton, Wool, Silk and the Rayons

Part IV—Viscose and Acetate Rayons

Published by the Fastness Commission of the Section for Chemistry of the Dyestuffs and Textile Industries of the German Chemical Society

(*Fourth Edition*, 1928, *Verlag Chemie G.M.b.H., Berlin W.* 10)

[Editor's Note: Since the publication in this journal (XVI, 611 ff., 641 ff., 673 ff. (1927), issues of October 3, October 17 and October 31 of that year), of the Report (third edition) of the German Fastness Commission, a fourth edition of the Report has been issued. In it are contained many changes, some of which are slight, some of great importance. These will be presented to the readers of the Reporter, for examination, comparison and study, as soon as possible. In the meantime, since the present edition contains entirely new sections on the viscose and acetate rayons, it has been thought advisable to present these to our readers at once, pending the preparation of the translation of the revised parts on cotton, wool and silk.]

Preface to Fourth Edition

IN this present fourth edition of the report of the Fastness Commission, the standards and types for dyed viscose and acetate rayons are new.

Under cotton, the standards and types for fastness to washing, boiling, water, ironing, acid, chlorine, perspiration and mercerization have been newly worked up. Standards and types have been established for fastness to rubbing, as well as for fastness to scrooping, peroxide, and the soda boil.

Under wool, the sections on fastness to water, milling, potting, perspiration and steaming have been modified.

Under silk, the section on fastness to perspiration has been worked up anew. The numbers given in parentheses after the type dyestuffs refer to the sixth edition of G. Schultz' Farbstoff-Tabellen, Berlin, 1923.

The Committee of the Fastness Commission: Beil, Brass, Haller, Hansmann, Hoemberg, Immerheiser, Jost, Krais, Lehne, Loewenthal, Meyer, Schroers, Walther.

Frankfurt a.M., April, 1928.

D. DYED VISCOSE RAYON

1. Fastness to Light

The test is carried out by exposing the dyed samples, side by side with the types, each on the same material, under glass in a cabinet placed in open daylight, the dyeings having one-half covered with thick paper or cardboard.

Five types have been established:

I. Four-tenths per cent China Green cryst. (495) on mordant. The material is treated for one hour at 60° C. with 1.5% tannin and 1% acetic acid, at a bath ratio of 1:20, then left for two hours in the cooling bath, with frequent working, taken out and centrifuged, and after-treated cold for thirty minutes in a fresh bath with 0.75% of tartar emetic, then rinsed. Dyed as customary for basic dyestuffs.

II. Four per cent Diamine Rubine S, dyed with 20% cryst. Glauber salt, 0.5% soda ash, and 2% Monopole soap for one hour at 75° C., bath ratio 1:30.

III. Two and one-fourth per cent Brilliant Benzo Fast Violet BL, dyed as under II.

IV. One and one-half g. Naphthol AS-RL per liter at 30° C., steeped twenty minutes, and after squeezing developed with 2 g. Fast Red RL Base per liter for twenty minutes. For this quantity of Naphthol AS-RL, 2 c.c. of Turkey Red oil, 4.5 c.c. caustic soda solution of 34° B., and 1.5 c.c. formaldehyde are used. (In the developing bath acetic acid is used instead of aluminum

sulphate.) After dyeing, soaping with 3 g. Marseilles soap per liter at 60° C.

V. Twenty per cent Indanthrene Blue GC (843), dyed according to procedure IN, bath ratio 1:30, soaped with 3 g. Marseilles soap per liter of distilled water for ten minutes at 85° C.

2. Fastness to Washing

The test is carried out according to the two following methods:

(a) The sample is plaited with undyed material as given under 4, and treated at a 1:50 bath ratio for one-half hour, at 40° C., with 2 g. Marseilles soap per liter of distilled water, then squeezed out ten times in handfuls, each handful being each time dipped into the bath, taken out, and squeezed. The sample is finally rinsed and dried.

(b) As under (a), only with 5 g. soap and E g. soda ash per liter of bath.

Standards	*Types*
I. Treated according to (a): strong alteration of depth and tone, as well as strong bleeding upon the whites.	I. One-half per cent Rhodamine B extra (573) dyed as given under 4, I.
III. Treated according to (b): no or only slight alteration of the depth and tone; white material colored.	III. Three and one-half per cent Diamine Fast Violet BBN, dyed as given under 1, II.
V. Treated according to (b): depth and shade unaltered; white material unaltered.	V. Ten per cent Indanthrene Brilliant Green B in paste, dyed as given under 1, V.

3. Fastness to Boiling (Degumming)

(a) The sample, plaited up with silk and cotton, is boiled in a solution of 5 g. Marseilles soap and 0.5 g. soda ash per liter of distilled water for one hour, the water which evaporates being replaced.

(b) As under (a), but boiled three hours.

Standards	*Types*
I. Treated according to (a) and (b): depth and tone strongly altered; white material strongly colored.	I. Two per cent Chrysophenine G (304), dyed as given under 1, II.
III. Depth and tone not or only a little altered; white material, according to (a), somewhat; according to (b) moderately colored.	III. Three per cent Diazo Rubine B, dyed and developed with beta-naphthol as given under 14, III.
V. Depth and tone unaltered, and white material not colored, according to methods (a) and (b).	V. Ten per cent Indanthrene Yellow RK, dyed according to procedure IK; other details as given under 1, V.

4. Fastness to Water

(a) The sample is plaited with cotton, wool, and silk, and viscose, in such a manner that there will be about one part of undyed material to two parts of the dyed, and so that each kind of fiber is in immediate contact with the dyed material. The plait is placed in distilled water at about 20°C., bath ratio 1:40, and left for one hour, then squeezed out and dried at ordinary temperature.

(b) Treatment as under (a), only the sample is left in the bath for twelve hours.

Standards	*Types*
I. Treated according to (a): strong alteration of depth; strong bleeding upon the whites.	I. One-half per cent Rhodamine B Extra (573), without mordant, dyed for 1 hour at bath ratio of 1:40 with 1% acetic acid at 50° to 60° C.
III. Treated according to (b): depth altered little or not at all; white material colored.	III. Three per cent Chloramine Yellow C (617), dyed according to 1, II.
V. Treated according to (b): depth unaltered; white material unaltered.	V. Ten per cent Indanthrene Brilliant Green in paste, dyed by procedure IN, as given under 1, V.

5. Fastness to Rubbing

The dyed material is rubbed ten times vigorously, back and forth, with a piece of unfinished white cotton cloth (or soft cotton rag) drawn over the index finger. The distance rubbed should be about 10 cm.

Standards	*Types*
I. Dyeing rubs off badly.	I. One and one-half per cent Rhodamine B Extra (573), dyed as given under 1, I.
III. Dyeing rubs off somewhat.	III. Five per cent Primuline (616), dyed and developed with beta-naphthol as given under 14, III.
V. Dyeing does not rub off.	V. Two per cent Crysophenine G (304), dyed as given under 1, II.

6. Fastness to Ironing

The dyeings are ironed at about 185° C. The temperature is determined by placing upon the ironing surface of the iron a small crystal of succinic acid (m. p. 185° C.), and waiting until this has completely fused. The drop of melted material is wiped off with a bit of cotton cloth. The dyeings are pressed with the hot iron for ten seconds, but the alteration of the color on the ironed surface estimated by comparison with the unironed part.

Standards	*Types*
I. Dyeing strongly altered; the original tone returns only after some time.	I. One per cent Brilliant Benzo Violet B, dyed as given under 1, II.
III. Dyeing altered: on cooling, the original tone reappears fairly rapidly.	III. Three per cent Brilliant Azurine R, dyed as given under 1, II.
V. No alteration in the dyeing.	V. Three per cent Diamine Scarlet B (319), dyed as given under 1, II.

7. Fastness to Sulphur Stoving

The sample, plaited with wool and silk, is wetted out in a solution of 5 g. Marseilles soap per liter of distilled water, at 20° C., then wrung out. It is then placed in a chamber filled with the fumes of burning sulphur, where it remains overnight. It is then well rinsed, squeezed and dried.

Standards	*Types*
1. Depth and tone strongly altered; white material colored.	I. Three per cent Orange RO, dyed with 15% cryst. Glauber salt for 1 hour at 50° C., in bath ratio 1:30.
III. Depth and tone somewhat altered; white material not colored.	III. One per cent Diamine Brown 3G (344), dyed as given under 1, II, and after-coppered with 1% copper sulphate and 2% acetic acid for 20 minutes at 80° C., then rinsed.
V. Depth and tone unaltered; white material not colored.	V. Ten per cent Indanthrene Brilliant Green B in paste, dyed as given under 1, V.

8. Fastness to Perspiration

The test is carried out as follows: The dyeings are laid between bleached cotton muslin and woolen cloth, and all rolled up together; or they may be plaited with cotton and wool. The sample is placed in a solution of 5 g. common salt and 6 c.c. of 24% ammonia per liter, bath ratio 1:10, is left in the bath for one-half hour at 45° C., and squeezed by hand ten times at intervals of ten minutes. After one-half hour, 7.5 c.c. of glacial acetic acid per liter of bath are added, and the material treated as before for one-half hour further, squeezing ten times at the end of each ten minutes. The material is then removed, squeezed out well, and dried at the ordinary temperature without rinsing.

Standards	*Types*
I. Depth and tone rather strongly altered; strong bleeding upon the white material.	I. Four per cent Brilliant Sky Blue 8G Extra, dyed 1 hour at 85° C. with 40% cryst. Glauber salt and 2% acetic acid, then rinsed. Bath ratio 1:25.
III. Depth and tone not or only slightly altered; white material somewhat colored.	III. Three per cent Diamine Fast Red F (343), dyed as given under 1, II, rinsed, and afterchromed one-half hour at 85° C. with 3% chromium fluoride, and 3% acetic acid, then rinsed.
V. Depth and tone unaltered; white material unaltered.	V. Twenty per cent Indanthrene Blue GCD in paste (842), dyed and procedure IN, bath ratio 1:40 as given under 1, V.

9. Fastness to Alkali (Street Mud and Dust)

The dyed material is spotted with a solution of 10 g. quicklime and 10 g. ammonia of 24% per liter, dried without rinsing, and brushed.

Standards	*Types*
I. Tone strongly altered.	I. One and one-half per cent Malachite Green cryst. (495), dyed as given under **1, I.**
III. Tone is altered.	III. Three-tenths per cent Direct Deep Black E Extra, dyed as given under 1, II.
V. No alteration of tone.	V. Ten per cent Indanthrene Brilliant Green B in paste, dyed as given under 1, V.

10. Fastness to Cross Dyeing (Acid Boil)

The dyed material is plaited with the same quantity of wool and cotton, and boiled one hour with 10% sodium bisulphate on the weight of the goods, at a 1:40 bath ratio, then rinsed in cold water, squeezed, and dried.

Standards	*Types*
I. Depth and tone strongly altered; white material strongly colored.	I. One per cent Rhodamine B Extra (573), dyed as given under 1, I.
III. Depth and tone not or little altered; wool rather strongly colored, cotton not or only slightly colored.	III. Two per cent Diazo Indigo Blue 3R, dyed, diazotized, and developed with beta-naphthol as given under 14, III.
V. Depth and tone unaltered; white material unchanged.	V. Ten per cent Indanthrene Brilliant Green B in paste, dyed as given under 1, V.

11a. Fastness to Acid

The dyed material is spotted with 1:10 tartaric acid solution, and the alteration of color tone estimated by comparison with a spot made with water.

Standards	*Types*
I. Strong alteration of tone.	I. Two per cent Benzopurpurine 4B (363), dyed as given under 1, II.
III. The tone is altered.	III. One and one-half per cent Direct Deep Black E Extra, dyed as given under 1, II.
V. Tone unaltered.	V. Ten per cent Indanthrene Brilliant Green B in paste, dyed as given under 1, V.

11b. Fastness to Scrooping

The dyed material is worked for five minutes in a bath of 5 g. lactic acid per liter of distilled water, at a bath ratio of 1:30, at the ordinary temperature, then squeezed out and dried without rinsing.

Standards	*Types*
I. Strong alteration of tone.	I. Three per cent Benzopurpurine 4B (363), dyed as given under 1, II.

III. Tone somewhat altered.

V. No alteration of tone.

III. Three per cent Benzo Olive, dyed as given under 1, II.

V. Twenty per cent Indanthrene Blue RS in paste, (838), dyed as given under 1, V.

12. Fastness to Chlorine

The test is carried out according to two methods:

(a) The dyed material is plaited with the same amount of cotton and viscose, wetted out, and immersed for one hour in a freshly prepared bath of sodium hypochlorite (1 g. active chlorine per liter) at about 15° C., then rinsed, soured, rinsed, squeezed, and dried.

(b) As under (a), only with the use of bleaching-powder solution (1 g. active chlorine per liter).

Standards	*Types*
I. Treated according to (a) and (b): strong alteration of depth and tone.	I. One and one-half per cent Diamine Brown M (344), dyed as given under 1, II.
III. Treated according to (a): no or only slight alteration of depth and tone. Treated according to (b); strong alteration in depth and tone.	III. Five per cent Hydrone Blue R 30% paste (748), dyed according to the hydrosulphite method.
V. Treated according to (a) and (b): depth and tone unaltered.	V. Padded with 2 g. Naphthol AS-BO per liter at 30° C. Steeped for 20 minutes, and after squeezing developed with 2.7 g. Fast Red B Base per liter for 20 minutes. (For 2 g. AS-BO, use 3 c.c. Turkey Red oil, 6 c.c. caustic soda solution of 34° B., and 2 c.c. of formaldehyde. Use acetic acid in the developing bath in place of aluminum sulphate.) After dyeing, soaped with 3 g. Marseilles soap per liter at 60° C.

13. Fastness to Bleaching

The dyed material is plaited with wool, cotton, and silk, and bleached with hydrogen peroxide. The bleaching bath is made up with 100 parts of distilled water, and twenty parts of hydrogen peroxide of 10 to 12% by volume. The solution is made very weakly alkaline with a small quantity of water glass solution. The bath must be kept alkaline during the process of bleaching (test with red litmus paper).

The material is placed in the bath at about 45° to 50° C. (bath ratio 1:40 to 1:50) and allowed to lie for twelve hours in the slowly cooling bath. Care must be taken to keep the material always under the surface, and strong stirring must be avoided. After bleaching, the material is rinsed and dried.

Standards	*Types*
I. Depth and tone strongly altered; white material colored.	I. One per cent Rhodamine B Extra (573), dyed as given under 1, I.
III. Depth and tone not or little altered; white material colored, but less so than under I.	III. Three per cent Benzo Red 10B, dyed as given under 1, II.
V. Depth of tone unchanged; white material uncolored.	V. Ten per cent Indanthrene Brilliant Green B in paste, dyed as given under 1, V.

14. Fastness to Milling

The test is carried out by the use of two methods:

(a) Neutral Milling: The dyed material is plaited with the same quantity of wool and cotton, then treated at 30° C. in a milling bath (ratio 1:40) of 20 g. Marseilles soap per liter of distilled water. The sample is first well milled by hand, then left in the bath two hours, then milled well again, washed and dried.

(b) Alkaline Milling: Treatment is as above, but at a temperature of 40° C.; the bath containing 20 g. of Marseilles soap and 5 g. of soda ash per liter.

Standards	*Types*
I. Treated according to (a); strong alteration of depth and tone; white material colored.	I. One per cent Rhodamine B Extra (573), dyed upon pre-mordant as given under 1, I.
III. Treated according to (a); no or only slight alteration of depth and tone. White material not colored, or only the cotton colored.	III. Four per cent Diazo Brown 3R, dyed as under 1, II, diazotized, and developed with beta-naphthol. The dyeing is finally soaped for about 5 minutes at 35° C. with 2 g. Marseilles soap per liter, and then rinsed.
V. Treated according to (b); depth and tone unchanged; white material uncolored.	V. Ten per cent Indanthrene Brilliant Green B Paste, dyed according to procedure IN, as given under 1, V.

15. Fastness to Potting

The dyed material is plaited with the same amount of wool and cotton, and placed for two hours in seventy times the quantity of distilled water at 90° C., then rinsed and dried.

Standards	*Types*
Depth and tone strongly altered; white material strongly colored.	I. Two per cent Chrysophenine G (304), dyed as given under 1, II.
III. Depth and tone not or hardly altered; white material colored, but not so strongly as under I.	III. Three per cent Primuline (616), dyed, diazotized, and developed with beta-naphthol as given under 14, III.
V. Depth and tone unaltered; white material uncolored.	V. Ten per cent Indanthrene Brilliant Green B Paste, dyed as given under 1, V.

16. Fastness to Dry Steaming (Decatizing)

(a) The dyed material, wrapped up in woolen cloth, is steamed in the steamer for ten minutes at a pressure of one-half atmosphere.

(b) As above, but steamed for ten minutes at a pressure of 2½ atmospheres.

Standards	*Types*
I. Treated according to (a): depth and tone strongly altered.	I. Three per cent Sulphocyanine G (257), dyed as given under 13, I.
V. Treated according to (b); depth and tone unchanged.	V. Twenty per cent Indanthrene Blue GC, dyed as given under 1, V.

E. DYED ACETATE RAYON

1. Fastness to Light

The test is carried out by exposing the samples, beside the types, dyed in yarn or piece, to daylight under glass in a cabinet located in the open, the materials being half-covered with thick paper.

Five types have been established:

I. One per cent Methylene Blue BGX (659). The acetate rayon is mordanted in a 1:20 ratio bath, with an 8% solution of "Mordant for Acetate Rayon," for ten minutes at 50° to 60° C. After centrifuging, it is dyed, without rinsing, in a 1:30 bath for one hour, by entering at a low temperature and gradually increasing to 70° C., the bath containing 2 c.c. of acetic acid per liter.

II. Two-tenths per cent Fuchsine A Powder (513). Mordanted and dyed as under I.

III. Three per cent Cellit Fast Violet 4R. The material is dyed at a bath ratio of 1:30 for one hour at 60° to 70° C., with the addition of 50% calcined Glauber salt. After dyeing the goods are rinsed.

IV. Three per cent Cellit Fast Violet ER, dyed with 50% ammonium chloride at a bath ratio of 1:30 for one hour at 60° to 70° C. Goods are rinsed after dyeing.

V. Ten per cent Cellitone Fast Violet B Paste. Dyed for one hour, at a bath ratio of 1:20, at 60° to 70° C., in a slightly frothing bath of 2 to 3 g. Marseilles soap per liter of distilled water. The goods are then rinsed in soft water.

2. Fastness to Washing

The material is plaited with cotton, wool, silk, and acetate rayon, as given under 3, and treated for one-half hour at 40° C., in a bath ratio of 1:50, with 2 g. Marseilles soap per liter of distilled water, then squeezed out by hand, each handful being dipped each time into the bath, taken out, and squeezed. The material is finally rinsed and dried.

Standards	*Types*
I. Rather strong loss of depth and tone; white material colored.	I. One per cent Methylene Blue BGX (659), mordanted and dyed as given under 1, I.
III. Depth and tone not altered; white material somewhat colored.	III. Four and one-half per cent Celitone Blue Extra Paste, dyed as given under 1, V.
V. No alteration in depth and tone; no bleeding upon the whites.	V. Four per cent Cellitazol ST, dyed, diazotized, and developed as given under 3, V.

3. Fastness to Water

The material is so plaited with cotton, wool, silk and acetate rayon that there are two parts of dyed material to one part of white material, of which some part of each kind must be in intimate contact with the dyed material. The sample is immersed in distilled water for one hour, at about 20° C., at a bath ratio of 1:40. It is then squeezed and dried at the ordinary temperature. The treatment can be repeated for a second and a third time.

Standards	*Types*
I. With a single treatment the depth is altered but little; white material is strongly colored.	I. Two per cent Rhoduline Blue 5B, mordanted and dyed as given under 1, I.
III. With a second treatment (each time with fresh water), the depth is not altered; whites somewhat colored.	III. Ten per cent Cellitone Fast Pink B Paste, dyed as given under 1, V.
V. With a third treatment (fresh water), the depth is not altered; the whites are not colored.	V. Four per cent Cellitazol ST, developed with 4% Developer ON. The dyestuff is dissolved in hot water, any slight residue possibly present is dissolved by addition of a little acetic acid, and without any further addition the material is dyed for ¾ hour at 40° to 70° C., at a bath ratio of 1:30; then rinsed, diazotized in the cold for 20 minutes with 4% sodium nitrite and 10% hydrochloric acid of 20° B., rinsed slightly, and developed for a half hour at 60° to 70° C. with 4% of Developer ON, which has previously been dissolved with hot water and the same amount of caustic soda solution of 38° to 40° B. The developer before use is made slightly acid by addition of acetic acid.

4. Fastness to Rubbing

The material is vigorously rubbed ten times, back and forth, with a piece of unfinished white cotton cloth stretched over the index finger. The extent of the rubbing should be about 10 cm.

Standards	*Types*
I. The dyeings rub off strongly.	I. Eight-tenths per cent Methyl Violet B Extra (515), mordanted and dyed as given under 1, I.
III. The dyeings rub off somewhat.	

V. The dyeings do not rub off.

III. Three per cent Cellit Fast Violet ER, dyed as given under 1, IV.

V. One-quarter per cent Cellitazol B, developed with 1.5% of Developer ON. One part of Cellitazol B is brought into solution with 50 parts of boiling water and 2 parts of hydrochloric acid of 20° B. After about ¼ hour's dyeing, 10% of sodium acetate is added, the dyeing completed in ½ hour, the material rinsed, diazotized, and developed as given under 3, V.

5. Fastness to Ironing

The dyed material is covered with a thin, white, unfinished cotton cloth, which is moistened with distilled water (100% humidity), and ironed with an iron which is at a temperature of 100° C. The temperature of the iron is determined by means of alpha-naphthol (m. p. 96° C.) and pyrocatechin (catechol) (m. p. 104° C.). The ironing is continued until the moist overlaid cloth is completely dry. The alteration of the dyeing is to be estimated by comparison of the still hot area with the adjacent unironed parts of the dyed material, and any marking off upon the overlaid white cloth is to be noted.

Standards	*Types*
I. Tone unaltered. Dyeing marks off badly upon the cotton cloth.	I. Three per cent Cellit Fast Blue A, dyed as given under 1, III.
III. Tone unaltered. Dyeing marks off somewhat upon the cotton cloth.	III. Eight - tenths per cent Methyl Violet B Extra (515), mordanted and dyed as given under 1, I.
V. Tone unaltered. Dyeing does not mark off.	V. Four per cent Cellitazol ST, dyed, diazotized, and developed as given under 3, V.

6. Fastness to Sulphur Stoving

The dyed material, plaited with wool and cotton, or sewed into a piece of union goods, is wetted out in a solution of 5 g. Marseilles soap per liter of distilled water, then wrung out. It is then hung up in a chamber filled with the fumes of burning sulphur, where it is left overnight, then well rinsed in cold water, squeezed, and dried.

Standards	*Types*
I. Depth and tone strongly altered.	I. Five per cent Metachrome Orange 3R Double, dyed as given under 12, I.
III. Depth and tone little altered; white material somewhat colored.	III. One per cent Diamond Green BXX (495), mordanted and dyed as given under 1, I.
V. Depth and tone not altered; white material not colored.	V. Four per cent Cellitazol ST, dyed, diazotized, and developed as given under 3, V.

7. Fastness to Perspiration

The test is to be carried out as follows:

The dyed material is laid out between layers of acetate rayon, unweighted natural silk, bleached cotton muslin, and woolen cloth, so that immediate contact is established with each, and the whole rolled up together, or the above materials are plaited together. The sample is placed in a solution of 5 g. of common salt and 6 c.c. of ammonia water of 24% per liter, bath ratio 1:10, left there for one-half hour at 45° C., and squeezed by hand ten times every ten minutes. After one-half hour, 7.5 c.c. of glacial acetic acid per liter are added, and the above treatment, with squeezing, continued for another one-half hour. The sample is then removed, squeezed, and dried at the ordinary temperature without rinsing.

Standards	*Types*
I. Depth and tone altered; strong bleeding upon the white material.	I. One per cent Methylene Blue BGX (659), mordanted and dyed as given under 1, I.
III. Depth and tone not or only little altered; white material somewhat stained.	III. Ten per cent Cellitone Fast Blue B, dyed as given under 1, V.
V. Depth, tone, whites unaltered.	V. One per cent Cellitazol SR, dyed as given under 9, III, developed with 1.5% phenol and soaped or ½ hour at 60° C. with 3 g. of soap per liter.

8. Fastness to Alkali (Street Dirt)

The dyed material is spotted with a solution of 10 g. of quicklime and 10 g. of ammonia water of 24% per liter, squeezed, dried at the ordinary temperature, and then well brushed.

Standards	*Types*
I. Tone strongly altered.	I. One-half per cent Rhodamine B Extra (573), mordanted and dyed as given under 1, I.
III. Tone somewhat altered.	III. One-fourth per cent Cellitazol B, dyed, diazotized, and developed as given under 4, V.
V. No change in the color or tone.	V. Four per cent Cellitazol ST, dyed, diazotized, and developed as given under 3, V.

9. Fastness to Cross Dyeing (Acid Boil)

The dyed material, sewed into white woolen cloth, is treated, at a bath ratio of 1:70, at 90° C., with a solution of 2.5 g. of sodium bisulphate per liter of distilled water, for 1½ hour, then rinsed and dried.

Standards	*Types*
I. Depth and tone rather strongly altered; white material strongly colored.	I. Three per cent Cellit Fast Blue A, dyed as given under 1, III.

(*Continued on page 275*)

Color Captures the Transparent Package

Selling Textiles by Sight—Uses of the Transparent Package—Seasonal Merchandising

By Waldon Fawcett

TO color has belonged, for some years past, the lion's share of the credit for the advertising capitalization of the modern package. Typography has played its part, of course, and the versatility and adaptability of container design. The very multiplicity of the commodities sent to the retail market in unit packages has also served to command a larger measure of public attention for this medium, which spares handling between primary producer and ultimate consumer. But it is color embellishment, more than all else, which has invested the package with the "attention value" and "shelf value" that are so surely translated into increased sales.

If we concede that color is the mainstay of persuasive package merchandising, it is immensely important that color has captured the transparent package. The transparent package, in its latter-day aspects, is so new that it was almost too much to expect that it should forthwith invoke the spectrum. That, however, is precisely what has come to pass. In a sense, color assumes in this environment a more important function than it has had in the other spheres of packaging. Elsewhere the contribution of color has been purely ornamental. In the case of the transparent package the intervention of color operates to emphasize the qualities and enhance the appearance of the packaged articles.

Selling Textiles by Sight

Broadly, the transparent package may be defined as any receptacle that exposes its contents to view, wholly or in part, with the reservation that this does not encompass any of the versions of the glass package, such as jars, bottles, etc. As commonly employed in trade the term "transparent package" signifies a goods carrier that relies for visibility upon a substitute for glass. The range extends from the smallest glassine on waxed paper envelope to the large-size container fronted with a generous "window" through which the contents may be examined by the prospective purchaser. In the earlier stages the transparent package was employed almost exclusively for those foodstuffs which should be available to inspection without risking the dust and the germs of the marketplace. Latterly, the lure of the transparent package has been discovered by marketers of towels, sheets and various textile specialties.

Sales executives first became conscious of the color influence in transparent packaging when it was noted that the ordinary clear, colorless medium was capable of sharpening or intensifying the color values of articles displayed behind it. This was not so true, to be sure, of the earlier and more primitive mediums of transparent packaging. But it has been noticeably true of the improved cellulose products and other present-day "outlook" wrappings. Due to qualities in the bleached sheets, some species of which have the nonfibrous and flexible properties in a high degree, there was imparted a sparkle and sharpness of focus that was all but magnifying in its effect upon the articles displayed under the plain and embossed coverings.

With this demonstration of capabilities in the sheet material, such as would scarcely be expected even in plate glass, it required only the present enthusiasm for color in industry to turn attention to the development of colored transparencies. The result, as measured in sales stimulus, is all that could have been expected. The transparent wraps, in sheets approximately 36 by 40 inches in size, are available in the standard colors—light blue, dark blue, amber, tango, pink, red, violet and green. At this writing the color versions are obtainable only in what is accounted the standard weight of transparent wrapping—viz., material having a thickness of approximately nine ten-thousandths of an inch. There is little doubt that if the color vogue increases, as it bids fair to do, there will ultimately be demand for tinted wrapping materials in the heavier thicknesses, up to seven one-thousandths of an inch in thickness. Colors are available, too, in the newly developed special types of transparent material that have unusual moisture-proof properties and that are coming into extensive use by the baking, candy, fish and dried-fruit industries.

The extent to which color is capturing the transparent package is not attributable solely to the ability of the color overlay to intensify eye-appeal. Practical economic considerations likewise enter in. For one thing, packers in certain branches of the food industries have discovered that their products which they would like to expose to view, cannot be so shown without risk of deterioration. Either the flavor or the appearance, or both, is effected by prolonged exposure to light. Color wraps are being tried in the belief that they will operate as satisfactorily as blue or amber glass to filter out the destructive elements of the sun's rays.

Another resource of color in transparent wrappings is found in its adaptability for varietal indexing. Many of the commodities that are going to market in trahsparent envelopes, cartons, etc., are stocked, in the average retail establishment, in various numbers, sizes, grades, etc. And yet the gradations of quality, dimension, etc., are not instantly apparent to hurried salespeople in spite of the transparency of the wrap. To unmistakably signal commodity species, price, etc., the plan has been adopted of assigning a distinctive color to each division in the line. With the significance of

the color scheme firmly implanted in the minds of store clerks, package assortments may be closely packed in display containers or cases, with the assurance that no time will be lost in locating and extracting the grade or model wanted. In the beginning, users of transparent packages who put up goods in a color range relied on plain windows or covers to reveal what color characterized the goods underneath. Latterly, sentiment has developed for the use of the colored wraps as an even more impressive means of proclaiming the sympathetic tint in the goods.

Seasonal Merchandising

The triumph of color in transparent wrappings has been aided not a little by the accommodation of the medium to the seasonal or occasional packaging which has lately loomed large as a means of increasing consumption. In every imaginable merchandise line—staples no less than specialties—packers are providing special packages for holidays and anniversaries. Most of our holidays and national festivals have long been associated in the popular mind with symbolic or traditional colors. Transparent packages in the respective appropriate colors afford convenient means of investing standard stock with holiday atmosphere. The allotment includes red for St. Valentine's Day, violet for Easter, pink for Mother's Day, amber for Hallowe'en and green for Christmas, not forgetting red, white and blue combinations for patriotic occasions.

Colored transparent package wraps are relied upon by some of the most progressive marketers to reinforce a trade-mark by emphasizing the distinctive or characteristic trade-mark color. Examples of this strategy are afforded by hosiery, lingerie, laces, gloves, embroidered goods and other products in the textile industries. In the case of many articles, whether by reason of their small size or delicate structure, it is undesirable to mount a large trade-mark. And yet it is a difficult problem—particularly in the case of the direct-wrapped small unit item—to stress the trade-mark identification sufficiently to insure attention by the consumer. When, as is usually the case, a trade-mark design is expressed in a recognizable color which becomes, to all intents and purposes, the essence of the brand, the trade-mark idea may, through use of a transparent wrap of the requisite color, be expanded to encompass the goods in their entirety, even though the actual trade-mark-bearing label remains small and unobtrusive.

The Providence, R. I., branch office of John Campbell & Co., dyestuff manufacturers of New York, moved its quarters to 78 Fountain Street, Providence, on April 1, and announced that the new location affords added facilities.

LARGE YARN MANUFACTURERS ADOPT TRADE-MARK "DURENE"

Mercerized Yarn Group Organize a Merchandising Association

Seven of the largest yarn manufacturers in the country, representing about 75 per cent of the trade's output, recently adopted the trade name "Durene" under which to market their high-quality mercerized yarns, and have formed themselves into a group to be known as the Durene Association of America.

This move represents an effort to wipe out the deceptive merchandising of textile fabrics, and has even been characterized in some quarters as one of the greatest forward steps taken by any branch of the textile industry in many years. By designating their products under a single brand the yarn processers believe they will have established joint protection for responsible manufacturers as well as for the consuming public. The fabric producers, it is explained, will thus be able to identify their finished products as containing a superior quality of yarn, while consumers will likewise be protected against deceptive advertising of inferior merchandise.

The term "Durene" has been officially adopted by the merchandising-advertising division of the knit underwear industry. The new association of processers has appointed J. S. Verlenden, of the Standard-Coosa-Thatcher Company, as president. The product "Durene" is described as having a base of superior grades of cotton fiber which has been so treated as to produce a luster and increase strength, elasticity and absorption.

The Durene Association comprises the following processers: Aberfoyle Manufacturing Company, of Philadelphia; American Yarn & Processing Company, Mount Holly, N. C.; Dixie Mercerizing Company, Chattanooga; Clarence L. Meyers, Inc., Philadelphia; National Yarn & Processing Company, Chattanooga; Spinners Processing Company, Spindale, N. C., and Standard-Coosa-Thatcher Company, of Philadelphia.

SOUTHERN TEXTILE SHOW AT GREENVILLE IN OCTOBER, 1930

The Ninth Southern Textile Exposition will be held in Textile Hall in October, 1930. More than one hundred applications for space have been received. Many more are expected.

So many exhibitors have applied for their former locations that little change will be made in the diagram of space on the first floor. On the second floor the layout will be modified. Some changes may also be made in the north end of the hall to obtain a more extensive use of the balcony. The annex will also be used.

Our Dye Output Set New Records in 1928

Tariff Commission's Census Report Shows Larger Vat Production, Heavier Sales, Exports and Imports

THE American dye industry continued its surprising progress last year, according to a preliminary survey issued last week by the United States Tariff Commission in connection with its annual Census of Dyes. The record of dye production for 1928, while marked by few unusual features, is yet a noteworthy one from several aspects. Not only was the total domestic output higher than in any previous year, but the increase in the number of fast dyes and specialty colors and the higher figures for the value of sales and for our export trade indicate a somewhat healthier activity within the industry.

The prelimmary figures show that domestic production of coal-tar dyes for the calendar year 1928 exceeded that for 1927 by approximately 1,400,000 pounds. Domestic colors supplied about 92 per cent of our consumption by quantity, and there was, in addition, an exportable surplus of the bulk low-cost colors amounting to over 32,000,000 pounds. Production by 47 firms of approximately 96,600,000 pounds was an increase of 1.5 per cent over the production in 1927. Sales of dyes in 1928 were 93,300,000 pounds, valued at $39,790,000. The quantity of sales shows a decrease of 5 per cent from 1927; the value of sales shows an increase of 3.3 per cent.

Outstanding features of American dye production in 1928 were:

1. Increase in production of vat and other fast dyes.
2. Production of many new fast and specialty dyes.
3. Reduction in the number of domestic manufacturers from fifty-five to forty-seven.
4. Increase in unit price of sales of all dyes.
5. Increase in exports.
6. Increase in dye imports.

Vat Dyes Make New Record

The production of vat dyes in 1928 established a new record with a total of more than 6,300,000 pounds, as compared with 5,961,688 pounds in 1927. Before the World War there was no production of vat dyes in the United States, and our entire consumption was imported from Germany and Switzerland. The increased consumption of vat colors indicates that the public realizes that although the fast dye is more expensive, *the cost of dye per yard of fabric or per garment is, in general, a small fraction of the total cost*, and that it is more economical to invest in the fast-dyed fabrics or garments.

A summary of production and sales of dyes and other finished coal-tar products for 1928 is shown in the following table:

Dyes and Other Finished Coal-Tar Products: Domestic Production and Sales, 1928

Name of Product	Sales Pounds	Sales Value	Production Pounds
Dyes	93,302,000	$39,790,000	96,625,000
Color lakes	11,366,000	6,464,000	11,447,000
Medicinals	4,005,000	8,651,000	4,008,000
Flavors	1,966,000	1,296,000	1,746,000
Perfumes	2,007,000	1,111,000	2,043,000
Synthetic phenolic resins	20,779,000	7,212,000	20,411,000
Synthetic tanning materials and photographic chemicals	7,063,000	1,100,000	7,048,000
Misc. coal-tar products	2,496,000	788,000	2,682,000
Total	142,984,000	$66,412,000	146,010,900

The total production exceeds the production of any year since 1918. In the above summary, photographic chemicals and synthetic tanning materials are combined in order not to disclose the operations of individual companies.

Production and Sales of Important American Dyes, 1928

Col. Index No.	Name of Dye	Sales Pounds	Sales Value	P'duct'n Pounds
10	Naphthol Yellow S	115,000	$97,000	131,000
16	Acid Yellow G	700	900	.....
17	Spirit Yellow R	38,000	34,000	36,000
19	Butter Yellow	23,000	19,000	23,000
20	Chrysoidine Y	766,000	239,000	736,000
24	Sudan I	49,000	36,000	45,000
26	Croceine Orange	23,000	11,000	.....
27	Orange G	99,000	53,000	.....
30	Fast Acid Fuchsine B	20,000	8,000	.....
31	Amido Naphthol Red G	194,000	76,000	204,000
36	Chrome Yellow 2G	96,500	47,000	98,000
40	Chrome Yellow R	79,000	42,000	79,000
53	Victoria Violet	43,000	31,000	52,000
57	Amido Naphthol Red 6B	140,000	69,000	164,000
73	Sudan II	28,000	26,000	26,000
79	Ponceau 2R	472,000	200,000	503,000
88	Bordeaux B	110,000	56,000	108,000
105	Acid Chrome Brown R	27,000	22,000	25,000
122	Alizarine Yellow 5G	12,000	10,000	9,000
138	Metanil Yellow	630,500	350,000	656,000
146	Azo Yellow	91,500	66,000	100,000
151	Orange II	1,400,000	364,500	1,419,000
161	Orange R	191,000	58,500	.....
165	Lake Red C (100%)	279,500	339,000	260,500
169	Chrome Violet B	12,000	11,000	16,000
170	Chrome Black PV	39,000	24,000	73,500
176	Fast Red A	138,000	82,000	106,000
179	Azo Rubine	148,000	93,000	154,000
180	Fast Red VR	203,000	110,000	221,000
184	Amaranth	28,000	15,000	28,000
185	Cochineal Red	105,000	61,000	109,000
189	Lake Red R	503,000	397,000	544,000
202	Chrome Blue Black U	1,150,000	411,000	1,275,000
204	Chrome Black A	257,000	98,500	311,000
208	Fast Acid Blue R	175,000	98,000	161,000
209	Fast Acid Blue B	19,000	15,500	.....
216	Chrome Red B	54,000	37,000	74,000
225	Direct Pink R	11,000	15,000	.....
234	Resorcin Brown B	182,000	114,000	182,000

Col. Index No.	Name of Dye	Sales Pounds	Sales Value	P'duct'n Pounds
235	Resorcin Dark Brown	21,000	16,000	26,000
246	Acid Black 10B	1,747,000	647,000	1,917,000
252	Brilliant Croceine	285,000	231,000	344,000
258	Sudan IV	42,000	44,000	39,000
262	Cloth Red 2B	28,000	22,000	26,000
274	Milling Orange G	3,500	3,000	9,000
278	Direct Fast Red 8BL	24,000	54,000	27,000
280	Scarlet EC	25,000	23,000	32,000
289	Fast Cyanine 5R	721,000	484,000	808,000
299	Chrome Black F	244,000	157,000	268,000
302	Chrome Blue Green B	21,000	16,000	37,000
307	Fast Cyanine Black B	241,000	173,000	291,000
308	Naphthylamine Black D	6,000	4,000	.....
326	Direct Fast Scarlet	298,000	348,000	248,000
331	Bismarck Brown	124,000	48,500	156,000
332	Bismarck Brown 2R	466,000	184,000	492,000
353	Direct Fast Pink 2BL	19,000	37,000	.....
364	Paper Yellow	128,000	111,000	139,000
365	Chrysophenine G	720,000	358,500	798,000
370	Congo Red	.....	.....	712,000
382	Direct Scarlet B	140,000	185,000	162,000
387	Direct Violet B	32,000	27,000	13,000
394	Direct Violet N	44,000	44,000	53,000
401	Developed Black BHN	1,087,500	426,000	1,204,000
405	Direct Blue 2B	1,078,000	265,000	1,268,000
410	Chrysamine G	3,000	2,000	.....
415	Direct Orange R	50,000	28,000	.....
419	Direct Fast Red F	150,000	109,000	180,000
420	Direct Brown M	147,000	89,500	172,000
448	Benzopurpurine 4B	476,000	230,000	456,000
472	Direct Blue BX	20,000	9,000	6,000
477	Direct Blue 3B	105,000	41,000	135,000
487	Acid Milling Red B	13,000	19,000	9,500
495	Benzopurpurine	36,000	34,000	26,000
502	Direct Azurine G	67,000	45,000	44,000
512	Direct Blue RW	172,000	132,000	167,000
518	Direct Pure Blue 6B	494,000	305,000	491,000
520	Direct Pure Blue	210,000	114,000	206,000
539	Direct Fast Black FF	184,000	98,000	248,000
581	Direct Black EW	6,084,000	1,725,000	6,998,000
582	Direct Black RX	444,000	140,000	483,000
583	Direct Green ET	112,000	55,500	132,000
589	Chloramine Green B	55,000	25,000	74,000
593	Direct Green B	522,000	200,000	519,000
594	Direct Green G	67,000	33,500	60,000
596	Direct Brown 3GO	583,500	210,000	600,000
598	Congo Brown G	109,000	67,000	103,000
620	Direct Yellow R	364,500	127,000	387,000
636	Fast Light Yellow 2G	55,000	69,000	52,000
639	Fast Light Yellow	182,000	222,000	179,000
640	Tartrazine	588,000	339,500	561,000
655	Auramine	873,000	710,000	921,000
666	Acid Green B	68,000	67,000	75,000
677	Magenta	37,000	68,000	.....
680	Methyl Violet	657,000	551,500	673,000
698	Acid Violet	190,000	206,000	227,000
704	Alkali Blue	136,000	307,000	156,000
737	Wool Green S	89,000	66,500	.....
773	Erythrosine B	2,000	7,000	1,000
793	Phosphine	184,000	206,000	193,500
812	Primuline	162,000	69,000	229,000
814	Direct Fast Yellow	202,000	188,000	249,000
861	Induline (water soluble)	222,000	153,000	240,000
864	Nigrosine (spirit soluble)	495,000	212,000	463,000
865	Nigrosine (water soluble)	1,514,000	529,500	1,625,000
883	Gallocyanine	51,000	92,000	45,000
909	Cotton Blue	.....	.....	60,500
922	Methylene Blue	483,000	450,000	575,000
1035	Alizarine Brown	31,000	54,000	29,500
1054	Acid Alizarine Blue B	319,000	672,500	414,000
1078	Alizarine Cyanine Green E	34,000	101,000	55,000
1085	Anthraquinone Blue Black B	93,000	146,000	112,000
1102	Anthraquinone Vat Green B and Black	152,000	90,000	210,000
1113	Anthraquinone Vat Blue GCD	696,000	546,000	851,000
1118	Anthraquinone Vat Yellow G	504,000	600,000	495,000
1150	Anthraquinone Vat Olive R	13,500	18,000	44,500
1151	Anthraq'none Vat Brown R	78,000	131,000	156,500
1177	Indigo, Synthetic, 20% Pst.	25,557,000	3,586,000	25,862,000
	Sulfur Black	15,757,000	2,207,000	14,355,000
	Sulfur Blue	837,000	429,000	1,002,000
	Sulfur Brown	1,671,000	535,000	1,730,000
	Sulfur Green	398,000	372,000	434,000
	Sulfur Maroon	525,000	275,000	618,000
	Sulfur Olive	118,000	35,000	179,500
	Sulfur Tan	172,000	53,000	.....
	Sulfur Yellow	479,000	198,000	470,000
	Benzo Fast Black L	149,000	139,000	140,000
	Zambesi Blacks	389,000	220,000	375,000

Coal-Tar Dyes: Domestic Production and Sales, 1914, 1920—1928

Year	Production Pounds	Sales Pounds	Sales Value
1914	6,619,729	.....	.....
1920	88,263,776	.....	.....
1921	39,008,690	47,513,762	$39,283,956
1922	64,632,187	69,107,105	41,463,790
1923	93,667,524	86,567,446	47,223,161
1924	67,679,000	64,961,433	35,012,400
1925	86,345,438	79,303,451	37,468,332
1926	87,978,624	86,255,836	36,312,648
1927	95,167,905	98,339,204	38,532,795
1928	96,625,000	93,302,000	39,790,000

Increase in Domestic Dye Prices

The weighted average price of all domestic dyes sold in 1928 was 9.2 per cent more than the average for 1927. The following table shows the trend of the average prices of domestic coal-tar dyes in recent years:

Domestic Dyes: Weighted Average Sales Price, 1917, 1920—1928

Year	Weighted Average* Sales Price of Domestic Dyes Per Pound
1917	$1.26
1920	.99
1921	.83
1922	.60
1923	.545
1924	.54
1925	.466
1926	.42
1927	.39
1928	.426

*Total value of all dyes divided by the total quantity.

Price increases were recorded for certain low-priced dyes and decreases for many high-priced dyes. Indigo, the leading color made in this country, shows an average sales price of 14 cents per pound, as compared with 12.1 cents in 1927 and 12.8 cents in 1926. In 1917, the first year domestic Indigo was produced, it sold for $1.42 per pound. The 1914 invoice value of imported Indigo was 12.8 cents per pound.

Relation of Production to Consumption

The imports of coal-tar dyes in 1928 were 5.5 per cent of total production by quantity and 10.5 per cent by value. They were *by quantity* 8 per cent of apparent consumption, assuming this to be equivalent to production plus imports minus exports. Based on preliminary figures, dyes manufactured in the United States, accordingly, supplied about 92 per cent of apparent consumption by quantity. By value, however, domestic production would be considerably less than 92 per cent of consumption, as the average prices of dyes imported are much higher than the average price of domestic dyes. There was an exportable surplus of certain dyes, including Indigo and Sulphur Black.

Coal-Tar Dyes: Domestic Imports, 1920—1928 and 1929 (Three Months)

Period	Pounds	Invoice Value	Monthly Average Pounds	Monthly Average Value
1920	3,402,582	$5,763,437	283,548	$480,286
1921	4,252,911	5,156,779	354,409	429,732
1922	3,982,631	5,243,257	338,850	436,838
1923	3,098,193	3,151,363	258,153	262,614
1924—				
First nine months	1,611,931	1,642,632	179,103	182,515
Last three months	1,410,608	1,266,146	470,203	422,049
Total	3,022,539	2,908,778	251,878	242,398
1925	5,209,601	4,637,240	434,133	386,437
1926	4,673,196	4,103,301	389,433	341,942
1927	4,182,026	3,423,918	348,502	285,326
1928	5,348,227	4,322,621	445,686	360,218
1929 (three months)	1,710,271	1,368,272	570,090	456,091

Increase in Quantity and Value of Imports and Exports

The total exports of coal-tar dyes in 1928 were 32,059,078 pounds, valued at $6,336,278. This represents an increase of 5,288,518 pounds in quantity and an increase in value of 15 per cent over that of 1927.

The imports of dyes during 1928 were 5,348,227 pounds, with an invoice value of $4,322,621. This represents an increase of 27.9 per cent by quantity and 26.2 per cent by value over that of 1927. Total imports in 1914, when our consumption was very largely supplied by imports, amounted to 45,950,895 pounds. On September 22, 1924, the ad valorem duty on dyes and other finished coal-tar products was reduced from 60 to 45 per cent ad valorem, following which there was an increase in the imports, particularly of the vat dyes, certain acid, acid alizarine and other high-cost specialty types.

Imports originate almost entirely in Germany and Switzerland.

EXTRACT EXHIBIT AT KNITTING ARTS SHOW

A "Whirlwind" extractor and a Duplex doubler and twister for silk and rayon throwing will be exhibited in operation by the Fletcher Works, Inc., in Booths Nos. 95 and 96 at the Knitting Arts Exhibition at Philadelphia, which opens on Monday, April 15.

The line of throwing machines now produced by the Fletcher Works, it is stated in a recent announcement, was formerly built by the Scranton Silk Machine Company, of Scranton, Pa. The Duplex doubles and twists as many as twelve threads in one operation, and is equipped with a quick-acting stop-motion which stops the particular spindle when the thread breaks, patented double feed rolls and an improved vertical motor drive.

In attendance at the Fletcher booths during the week of the exhibition will be C. W. Schaum, R. J. Bartholomew, W. H. Rometsch, Jr., C. W. Moore, A. W. Thomas and H. N. Rahn.

ATLANTIC CITY AUDITORIUM WILL HOUSE THE AMERICAN FAIR

The first national merchandising exposition in the history of the United States—described officially as the "American Fair"—will be held this year from August 3 to 25, inclusive, in the new Atlantic City Auditorium, the largest building of its kind in the world, it was announced recently in New York City by United States Senator Walter E. Edge of New Jersey, Governor Morgan R. Larson of New Jersey, and Anthony M. Ruffu, Jr., mayor of Atlantic City.

Mayor Ruffu explained that the object of the American Fair, which will be held annually, is to provide manufacturers with a new medium for promotional and merchandising activities. It will be an exhibit of nationally-known American products which, he asserted, will be witnessed by 500,000 persons during the twenty-three days at the famous summer resort's peak period.

CENTRIFUGAL SPECIALIST JOINS AMERICAN LAUNDRY MACHINERY

Wilmer C. Dutton, formerly with Tolhurst Machine Works, has become associated with the American Laundry Machinery Company, and effective March 1 assumed his duties at their general offices in Cincinnati, O.

Mr. Dutton is well known in the textile industry, having started his career with the Tolhurst Machine Works, at Troy, New York, in 1916. About a year later he was made sales manager of this company, and in 1919 he was elected vice-president as well, and at that time

was transferred to their New York City office. From there he traveled all over eastern Canada and the entire United States.

Mr. Dutton will be engaged in engineering and sales work pertaining to extractors and centrifugals in this new position. He expects to make his home in Cincinnati, where we understand that his wife and children will join him in the near future. Mr. Dutton's friends in Philadelphia, New York, and elsewhere in the East will be sorry to see him take up his home elsewhere, but they feel that his present position will open up even a much wider field of activity.

CAROLINA COLLEGE HOLDS ITS "TEXTILE INSTITUTE"

Research, Rayon, Merchandising and Style Discussed

Dr. W. F. Edwards, director of the laboratories of the United States Testing Company, made a very interesting address on "Textile Research" during the annual Textile Institute sessions held at the Textile School of North Carolina State College last Wednesday and Thursday, April 10 and 11. A. N. Tenny, vice-president of the American Bemberg Corporation of New York, spoke on "Desirable Properties in Yarns of Chemical Origin." E. C. Morse of the New Uses Section of the Cotton Textile Institute told about "Extending Markets for Cotton Fabrics."

Other papers on the two-day program of this college's annual Textile Institute dealt with cotton processing and various phases of textile merchandising. E. T. Pickard, chief of the Textile Division of the Department of Commerce, addressed the gathering on "American Cotton Goods in the World's Markets." A style show was held on Thursday afternoon and a students' exhibition, during which all the machinery in the Textile Building was in full operation by students. Many varieties of textiles manufactured at the school were displayed.

THE CHEMIST IN INDUSTRY AT BRITISH FAIR

The relation of chemical products to the manufacturing industries was graphically exhibited at the recent British Industries Fair held last month at the White City, England. Fifty British chemical firms, including Imperial Chemical Industries, Ltd., and representing as a group a capitalization of almost five hundred million dollars, staged an elaborate display of their products in the London section of the fair. The chief function of these exhibits was to show how the British chemical manufacturer has adopted the discoveries of the research chemist and how they have adapted themselves to the needs of the newer industries, in which chemicals play such a significant part. Films shown illustrated the use of dyes, fertilizers, explosives.

Attack on American Fast Dyes Silenced Once More

Textile Men Rush to Defend Domestic Colors Against Dress Manufacturer's Indictment

WHEN an unnamed but allegedly important dress manufacturer was quoted in the Daily News Record, of New York, a few weeks ago on the subject of American dyes, he unwittingly let himself in for a hot counter-fire. His broad remarks were anything but complimentary to the dyestuffs manufactured in these United States and, like so many of the criticisms heard in the past, they smacked too obviously of either misinformation or malice. They were not allowed to pass unheeded, but drew warm denunciation from men prominent in our textile industry as well as from the ranks of dye manufacturers.

The assertions quoted as coming from the dress manufacturer are published below and are followed by some of the replies. This material is reprinted, by special permission of the Daily News Record, in the interests of justice and fair play for the American dye manufacturers and because of its significance to those consumers of American dyes who have by their confidence helped to maintain the reputation of the domestic coal-tar colors.

Dress Manufacturer Would Bring in German Dyes, if Necessary, to Correct Fast Color Situation

(*From the Daily News Record of March* 20)

CONVERTERS and cotton manufacturers generally do not view the fast color situation seriously enough, or they are too willing to be lenient in their own observations or interpretations. This is the statement of an important cotton dress manufacturer who has given the subject considerable attention, and concludes that the best efforts of the industry are not yet reflected in the bulk of the printing and dyeing.

One thing that is almost disgusting, he says, is the way in which so many sellers of wash fabrics are easily satisfied, when they call their stock clerks or whatever clerks are in charge—and ask: "How many of these goods came back?" The clerk replies: "None," or, "Very little"—and the seller smiles his confidence in the merchandising that has been done.

But, it is insisted, it is not the amount of goods that come back that counts or means anything—it is the amount of faith in cotton wash dresses that is being broken down or shattered, and about which the dress manufacturer or the converter or the mill can know little until it is too late.

There is altogether too much pointing to the few pieces of goods that come back, or to the limited number of garments which are returned, as proof that everything is all right in the wash dress business. The same is true in the piece goods departments of the retail stores. Inquiry is made as to their experiences

with fast color cotton fabrics, and the replies come back that everything is fine; guaranteed goods are bought, and very few goods are returned.

Charges Lack of Confidence

There is evidently a vast amount of confidence in the job that the industry is doing with regard to fast colors. This must be so, or there would not be the constant and repeated criticisms.

Buyers who study the subject say they find it difficult to get satisfactory information on the subject. They are told about the difficulty of getting the right kind of dyes for certain shades or colors, or they are told about troubles which finishers have with many dyes.

The dress manufacturer feels that the best effort is not being exerted where the fastness to washing is not absolute—and he cannot understand it.

Regardless of the progress that has been made by American dyestuff manufacturers since the war, there is still much that has not been perfected, it is stated.

The wash fabrics business has been very large this year, and will continue so. And the wash fabric business depends very largely upon the character of the dyes used in printing and dyeing.

The cotton textile industry should be keenly interested in doing everything possible to maintain the consumer interest in cotton wash frocks that if American dyes will not be sufficient insurance, then means for bringing in German dyes at fair prices should be the extreme measure.

The dress manufacturer says he knows this should be a last resort, but the stake is big—and the American dyestuffs producer must meet the emergency, assuming that, as the finisher says, the fault is with the dyes.

The users of the fabrics would like to see the volume on fast colors so great that it would be just as cheap to use the vats as any others. Before the war, when German dyes were used, the dress manufacturer says it was never necessary to question the character of a color, even on a cheap percale.

* * * *

Henry B. Thompson Defends Domestic Dyestuffs

THESE arguments are contradicted by Henry B Thompson, president of the U. S. Finishing Company, who states there is no trouble to be found with American dyes, that the same German dyes are available now as before the war, and that the only remaining obstacle in the way of complete fast color satisfaction is the persistent desire of many buyers to obtain their textiles "at a price."

"This implication that there is a mystery about fast color dyes, or that there is something vitally wanting in the quality of dyes, is absolutely wrong," said Mr. Thompson. "Quality for quality, the American dyestuff industry is to-day producing fast color dyes that are in every way the equal of the German dyestuffs. There are, in fact, certain dyes obtainable here that are superior to the foreign product."

It is not true, says Mr. Thompson, that all the post-war German dyes were fast color, no more than that is true to-day.

"As a matter of fact," he continued, "there isn't anything in the whole range of dyes produced in Germany before the war that isn't available now. And where a German dye happens to be preferable because either of quality or price, that dye is purchased. To-day the American dye industry is standing on its own feet, and the reasons which prompted protection during the war are no longer existent.

Denies Industry Neglects Research

"This dress manufacturer is also completely in error when he suggests that the American dye industry may be lacking in research effort. No, we are satisfied that the domestic dye producers are constantly doing everything possible in the carrying forward of intensive laboratory research. Obviously, research has been vital to the industry's very existence. Only two or three years ago the dye manufacturers were losing money in the development of vat colors, rather than earning their way as they are at present."

* * * *

A Leading Converter Says Price Is a Factor

TAKING up this discussion where Mr. Thompson left off, one of the leading converters stated:

"Of course, Mr. Thompson is entirely right when he states that the desire of many buyers to get goods 'at a price' is at the bottom of the fast color question, with its long trail of both innocent and deliberate misrepresentation. There is really nothing new to be said from that point of view. I believe everyone appreciates that the American fast color dyes are 100 per cent satisfactory—if the trade will pay the price. I certainly don't think that the dress manufacturer who claims to the contrary is at all representative of his industry.

"Resistance to the price that it is necessary for finishers to ask on vat color work will probably continue for some time to come. As Mr. Thompson states, there is to-day an average of about 3 cents a yard difference between quotations on vat print work and commercial colors. Of course, that differential is much smaller than it used to be, reflecting the material increases in the demand for vat colors that have taken place despite resistance.

"Nevertheless, I feel that the American dyestuff industry could well afford to shade prices on its dyes still more, instead of raising prices as it has during the past year on certain qualities and colors. My own opinion is that the tariff on foreign dyestuffs—aimed particularly at German dyes—is artificially keeping up prices on the dyestuffs of our domestic industry. If

the American dye manufacturers were far-sighted, if they would foresee the inevitable demand of the public for fast colors exclusively, they would do all they could to reduce prices and encourage the trend away from non-fast colors."

Finds Inferior Colors Being Used in Voiles

By way of illustrating the contention that many buyers put price first when buying printed or dyed materials, this converter pointed to the present situation in rayon voiles. "There are retailers," he said, "who last year, when the fabrics were new, would take nothing but the best rayon voiles. Now many are only talking price and there are more of the cheaper quality goods being bought. Most of these low-priced printed rayon voiles are not being made with genuine fast colors."

* * * *

United States Fast Colors Plentiful at Price

By G. T. Metcalf
Franklin Process Co., Providence, R. I.

WE read the recent article by a prominent cotton dress manufacturer in your "Market Viewpoint" section, March 20 issue.* We take exception to many of the statements made, and while considering what comment we should make in a letter to you we read in a later issue the reply to this article by Mr. Thompson, president of the U. S. Finishing Company. Our first impulse, after reading Mr. Thompson's comment, was not to write you at all, because we believe that Mr. Thompson's reply is entirely adequate. On second consideration, however, we are writing for the sake of emphasis, if for no other reason. . . .

It is evident to us that this manufacturer not only has found it difficult to get satisfactory information as regards the color situation, but also that in getting what information he has he has been grossly misinformed. Before answering his statements individually let us review and contrast the color situation before the war and at the present time.

Before the war, fast dyes had only recently been put on the market by German manufacturers. They were being used in yarn dyed shirting fabrics to a considerable extent and to some extent in gingham. Their application at that time to printed and piece dyed fabrics was even more limited. Their use in piece dyed fabrics, in fact, was negligible, due to difficulties of application.

Converters and manufacturers never thought of giving color guarantees, because buyers never asked about fastness of color. They knew that the colors would fade after a few washings, but they seldom objected, because they knew that the colors, even though unsatisfactory, were the best obtainable. The public was in the same frame of mind. Many women readily paid $1.25 a yard for an imported gingham. They knew from experience that after a few trips to the laundry these ginghams would fade badly, but nevertheless they were satisfied, because they believed that the colors were as fast as it was possible to produce.

*Daily News Record.

U. S. Makes 90 Per Cent of Fastest Dyes

Contrast this situation with conditions at the present time. Ninety per cent of the fastest dyestuffs suitable for the textile industry are now being made by American manufacturers. Three of the leading American producers offer approximately forty different dyestuffs that are equal in fastness to anything produced in Germany. These dyestuffs used in varying degrees of strength and in various combinations will produce an almost unlimited range of shades. For instance, in our standard fast-to-bleaching color card we offer seventy different shades and have many times that number of additional shades on file in our laboratory which have been developed for special purposes. Piece dyers, we understand, offer just as wide a range of shades, and the printers offer the widest range of all.

All of the large reputable dyers who maintain New York offices and have constant contact with the New York trade publish color cards showing their standard line of fast colors. These cards are widely distributed to the trade. Consequently, when new stylings are created, if the designers refer to the color card or consult with the dyer's representative, they know what the limitations are as regards the selection of shades of satisfactory fastness. In view of the wide latitude allowed them, it seems to us that there is little occasion for their going outside of these limitations. Of course, if they want very brilliant colors they must use basic dyestuffs which are very fugitive. Usually, however, such brilliant colors are not necessary or desirable. Aside from basic colors the vat colors are the brightest.

Better Dyes Cause Demand for Guarantee

We believe that the color situation of to-day as outlined above is more generally known in the trade than is sometimes supposed. A realization of the situation is, we believe, responsible for the prevalence of color guarantees in the last few years. The use of these color guarantees has, in turn, made buyers realize that colors of satisfactory fastness are now available, and at present the public also is fast coming to appreciate the situation and to demand the fastest color.

Your correspondent of the March 20 issue says that before the war it was not necessary to question the character of colors in cotton dress goods. Judging from the situation before the war, as we have just outlined it, we believe it is evident that the quality of the color was not questioned, because the public or the

(*Continued on page 265*)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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MARCH MEETING OF THE NEW YORK SECTION

THE March meeting of the New York Section was held at the Building Trades Employers Association Rooms, New York City, on March 29.

About forty members and friends were present for dinner. The minutes of the February meeting were read and approved and the Treasurer's report was read, showing that the Section was in debt; a resolution was duly made and carried that the Treasurer be instructed to ask for a grant of $100 from the parent body. The gathering listened to two very interesting papers upon the Application of Naphthols on Textile Fibers by R. W. Marsson and Dr. H. E. Hager. Scott Huntington also explained the use of the Texilscope, illustrating his talk by a moving picture film.

After the usual discussion and a rising vote of thanks to the speakers, the meeting adjourned about 10.15 p. m.

The introduction of the speakers, their papers and a report of the discussions follow.

P. H. STOTT, *Secretary.*

* * * * *

Chairman Knowland—The first paper this evening is to be presented by Mr. R. W. Marsson, of the General Dyestuff Corporation, who will speak on "The Application of Naphthols on Textile Fibers." Dr. Marsson! (Applause.)

. . . Mr. Marsson presented his prepared paper:

The Application of Naphthols on Textile Fibers

Part I—Dyeing

By R. W. MARSSON
General Dyestuff Corporation

I VERY gladly follow Mr. Knowland's suggestion to convey to the members of this Association the latest developments in the field of the naphthol series which, in a comparatively short space of time, has become so extremely popular on practically all grades of textiles.

I believe that one of the outstanding purposes of this association is to keep intimately posted on any developments in the dyestuff field and to gather all available information that leads towards the improvement of textiles. The shade and properties of a certain dyestuff are of no value until the latter is placed upon the fiber and the operation of dyeing is successfully terminated

The trade has come to the point of dissociating the name of a product from the maker of same and associating it with the product itself. I have always shared the opinion that a trade paper should present the advantages as well as disadvantages of the newest products and processes of application. It should be a factory of facts and not a repository of secrets and should thereby further co-operation between the producer and the consumer. At the occasion of three previous papers before this association, as well as in publications on the subject of naphthols, I have endeavored to convey all I know and have touched intimately on the practical side which in many ways is so different from that of any other group of fast colors.

The naphthols have persistently conquered in new fields and in their march to the front have replaced such strongly established colors as Alizarine Red, Paranitraniline, Primuline and Fast-to-Acid Cotton Reds. The history of the development of the Naphthol series is very fascinating, indeed, and the subject has been touched upon frequently. The work of perfecting the methods of manufacture and application and the necessity of educating the public to their remarkable fastness meant a comparatively slow development at first. It was no easy matter to convince the dyer that he was not being asked to do a "paint" job and it was still harder to satisfy the mill owner in regard to consistency of shade and production. The application methods had to be adjusted to the dyer's equipment. However, here was a group of colors of almost basic brilliancy, vat fastness and extremely economical reproduction possibilities. At the beginning the line was none too impressive—there were but few shades, most of them reds, and certain fastness properties were inferior to those of alizarines and vats. Improvements in these fastness properties and widening of the range of shades has been very rapid, however, and we can look for still further developments with justified optimism.

Allow me to outline to you now these recent developments.

Cotton naturally is still the most important field of application. The entire class of substantive naphthols—AS-BR, AS-SW, AS-TR—have, on account of their more pronounced affinity to the fiber, won a good deal of popularity for package machine dyeing. Their rate of exhaustion out of more or less concentrated impregnation liquor does not necessitate the use of a standing bath for more economical production. The substantivity of the naphthols, however, is one of the most important items in such cases where continuous operation or a larger proportion of liquor has to be considered. In these instances, the use of a stock solution becomes indispensable for economic reasons. Information on this subject is very frequently requested and I thought that a table clearly illustrating these properties might prove of assistance.

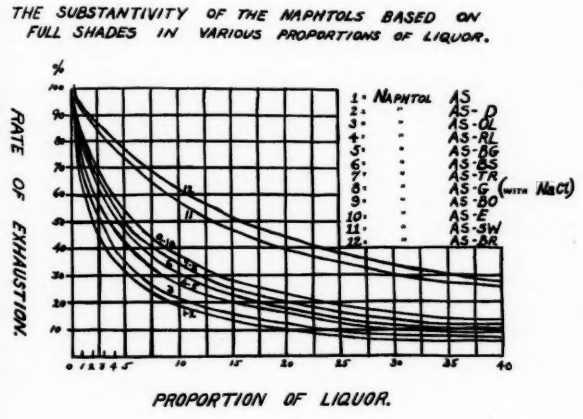
Dyeing Progress in the Far East

Before going into details of the new additions to the group of naphthols, bases and diazo compounds, I would like to say a few words about the progress that has been made here and in other countries in regard to the application of these colors on textiles other than cotton. It was my good fortune on my recent trip to Europe to come into contact with various experts from other parts of the world. Reports from India and Japan, South America and China, where the development of naphthols has been very pronounced also, have had my special interest and attention. Of course, the building up of business in these countries had to be carried out on given lines. No vital deviations are possible in methods of application, but the demands of the trade of the country in question have to be met and the dyeing carried out accordingly in the conveniences at hand. Generally speaking, developments in other parts of the world present no baffling surprises to us. They have, however, progressed in fields where we moved carefully or have been hesitant, i. e., principally in the dyeing of animal fiber as well as in viscose dyeing.

While the adoption of these products on rayon of all makes has more than come into its own in this country, the real silk dyer cannot overcome his aversion to using products fixable in alkaline solutions. It seems that Japan is leading the way here and practical samples secured abroad show beautiful designs produced with naphthols and vats. I have heard of no trouble in respect to the impairing or tendering of the fiber. In all instances the impregnation process was carried out cold with as little alkali as possible and with small additions of fiber protecting agents, such as Protectol I Powder, glue, etc. The shades produced show remarkable brightness and fastness as well. I took occasion to have a card made up, selecting all those combinations suitable for silk and possessing excellent fastness to degumming and peroxide bleach. I would like to pass this around for your inspection. At the same time I shall pass around a few designs of Japanese origin produced with naphthols and vats as mentioned before.

In China extensive and successful experiments have been carried out on wool carpet yarns to produce a line of suitable shades with naphthols that withstand the process of rug washing with small additions of caustic soda and chloride of lime. As I understand it, this washing process is used to produce a desirable antique effect and a glossy finish on Oriental rugs. Here naphthols have met the demand in regard to brilliancy of shade and fastness. The method of application and the be-

havior of the dyestuff on the fiber is somewhat different than on cotton. Best suitable are such naphthols as can be dissolved clearly with small amounts of caustic. Therefore substantive naphthols should be avoided in



order to fully maintain luster and the tensile strength of the fiber. Impregnation is carried out cold. Additions of fiber protecting agents, such as Protectol, etc., which are more or less essential on silk are disadvantageous on wool as they impair the depth and clearness of the shade. Formaldehyde should not be used in the naphthol bath for the same reason. Formaldehyde furthermore is detrimental to the structure of the fiber. Naphtholated wool can be exposed to the air for hours without decomposition of the naphtholate.

All naphthols on wool withstand the common salt rinse after the impregnation which leads to better fastness to crocking. In developing with various bases or salts, additions of bicarbonate improve the depth and evenness of the coupling action. The material is rinsed thoroughly, soaped at 120° F. and finally treated in a weak formic acid bath at 160° F. Dyeings produced in this way are excellently fast to fulling, have similar light fastness to that of the same combinations produced on cotton and as previously mentioned stand the most applied process of rug washing.

There may and there may not be a field in this country for naphthols on wool. The experimental and partly pioneer work in this respect, however, presents interesting facts to the naphthol dyer. I am passing around a few samples colored in this manner which have come over from China.

There is not much to be said in regard to application methods in India, South America, or other countries, although India is still one of the largest consumers of these products. The continuous process is not as popular in these countries as it has grown to be here and most of the dyeing is carried out on yarn and raw stock in the open vat and closed machines. The material is naphtholated in small batches out of very concentrated volumes of liquor, and the liquor is replenished from large stock solution tanks. The developing and finishing are carried out in larger batches, in somewhat higher volumes of liquor.

European types of package machines especially suitable for naphthols have gained considerable popularity in these countries.

Developments in Machine Dyeing

There is no doubt that everywhere rapid progress is being made in machine dyeing. With the increasing demand for faster colors, the manufacturer of dyeing machines had to step lively to keep up with the development, perfecting his design. In view of universal labor trouble and the lack of trained hands, there is no doubt that more dependability and precision can be obtained through machine dyeing. Skill and training of the boss dyer can still come into play in the final stages of the dyeing operation, but machines are relieving him of much of the preliminary work and are saving him energy. "Cleaner dyehouses and cleaner dyeings" should be the slogan, and as dyehouses, in spite of the abuse that is still heaped upon them, are no doubt money-makers, re investment in this direction should be seriously considered on this side of the ocean as well.

In dyeing the faster colors, such as naphthols and vats, proper dehydration is extremely important for two reasons: to remove the surface naphthol and to properly oxidize. In naphthol dyeing it facilitates proper penetration and insures cleaner results to crocking. The loading and unloading of machines should be carried out mechanically with the least amount of labor. Each time I return from Europe I am impressed by the fact that in the matter of modern equipment, this country, although constantly looking for increased production possibilities, has not as yet succeeded in adopting all the current improvements. Remarkable progress, however, has been made here in the perfection of continuous machines for warp and piece dyeing with naphthol products, achieving faultless results, remarkable economy and higher production possibilities. As these machines insure equally good results on non-substantive as well as substantive naphthols, the entire range of shades can be produced on them.

Range of Shade

Speaking of the range of shades, let us check up on how we stand to-day. For some time past we were able to produce shades such as yellow, orange from yellowish to reddish cast, reds, wines and Bordeaux of any cast.

We already had garnet, maroon and rust shades, navy blue and black. A large line of intermediary shades could be secured by mixing suitable naphthols or developing agents. There always was, and in a way still is, a gap in the line—it was impossible for us to produce a heavy brown, as well as a brighter blue, violet and green. In this respect, however, recent additions have begun to fill the gaps. Outstanding among these new products are the two new coupling agents, Variamine Blue Salt B and Fast Violet B Base. On a few suitable naphthols they produce shades of remarkable depth and brightness. Both products are about to be put on the market, and it will no doubt interest you to have some more detailed information in regard to shade and fastness properties. Experiments on a large scale have already proved their adaptability on any dyehouse equipment. Along with Variamine Blue Salt B a new naphthol is being introduced, Naphthol AS-E. The naphthol can only be used in conjunction with Variamine Blue Salt B, producing a very rich shade of navy blue. In regard to substantivity this new product stands in line with Naphthol AS-BO.

Before going further into details in regard to the new blue and violet, I would like to say a word about Fast Red RBE Base, another important addition to the line of developing agents. This product produces a red which matches Turkey Red and which stands kier boiling under pressure, when combined with Naphthol AS-SW or AS-TR. This important property along with excellent all-around fastness properties, opens for the above mentioned combinations possibilities in the towel trade and for colored bleach goods. Fast Red RBE Base can be applied on any type of machine available and is especially suitable for package dyeing. The product is easily diazotizable and gives a light-colored diazo solution which is almost as clear as water. It has to be neutralized with bicarbonate of soda and is completely coupled on a weak naphthol ground. It is advisable to prepare a fresh diazo solution for each successive lot because of inferior stability. However, this is by no means uneconomical as the base exhausts very well. Tests that have been made with the red combined with Naphthol AS-SW and with Naphthol AS-TR at various important mills in this country against Turkey Red, submitted to a severe kier boiling, have resulted in extremely favorable reports on these combinations.

Variamine Blue Salt B can be used in conjunction with the majority of the naphthols, and produces very pleasing shades of navy blue. These new blue combinations possess the general fastness properties of the well-known Naphthol AS reds and show decided advantages in fastness to light, washing, boiling caustic as well as in level dyeing properties and brilliancy of tone over the older Blue Salt B (Dianisidine) combinations. The fastness to chlorine bleach varies in the different combinations, and, generally speaking, is not quite as good as the Dianisidine combinations. The best suitable naphthol in this respect is, as above mentioned, Naphthol AS-E, which puts the fastness to bleaching on even terms with the Hydron Blues. This combination far surpasses the others in fastness to boiling caustic. The fastness to light is rated at from 5-6. In such cases where exceptional fastness to light is required, the Variamine Blue should be coupled on AS or AS-D combinations, which combinations rate from 6-7. On any naphthol ground Variamine Blue Salt B will couple to a greenish shade which changes to the proper bluish cast in the hot alkaline aftertreatment. Variamine Blue Salt B can also be dyed on Naphthol AS-SW ground producing a very rich navy blue shade equal to Hydron Blue R but considerably faster to washing. This new blue can also be produced out of a larger liquor as well as out of concentrated liquor in package machine dyeing. I am passing around a few dyeings produced with this new blue.

Recent Additions

Fast Violet B Base, a new coupling agent for various naphthols, produces very bright and full shades of violet with excellent fastness properties. Only the following naphthols are suitable in conjunction with this new product—AS, AS-TR, AS-RL, AS-BO and possibly AS-E and AS-SW. The shades of these last two combinations are not as brilliant and the general fastness properties not quite as good as those of the formerly mentioned naphthols. Dyeings as well as prints produced with Fast Violet B Base impregnated on the above mentioned naphthols are extremely fast to water and ironing. The fastness to light can be rated at 5, and 4-5 on AS-E and AS-SW. Combinations with this product show outstanding fastness to boiling caustic, even under slight pressure. When submitted to kier boiling tests they stand up much better than do the well-known red combinations, AS-SW KB Base and AS-TR TR Base. The developing solution as well as the printing paste of the base are extremely stable. In piece dyeing the goods are padded with the naphthol as usual, dried in between, padded in the coupling action and then soaped at the boil. It is in this aftertreatment that the proper shade is developed. The developing action can be accelerated by increased additions of soda ash. The shade is garnet in tone before the soaping aftertreatment. Fast Violet B Base gives an excellent yield and therefore can be used very economically. In an acid developing solution, however, the coupling effect is weak and irregular. It is therefore essential to control the neutral reaction of the developing bath. The most suitable alkaline binding agent is sulphate of magnesia and the proper proportion for the starting bath should be 2.8 grams sulphate of

magnesia to 2 grams Fast Violet B Base. In order to facilitate the dyeing of this new product we expect to be able to bring out the already diazotized diazo salt in a short time.

The above three products constitute the most important recent additions to the naphthol field.

Regarding other additions of less recent nature, as Naphthol AS-OL Fast Red Salt AL and Fast Red Salt RL, I would like to mention a few outstanding properties. Fast Red Salt AL has gained considerable popularity as it possesses extreme fastness to light on most of the naphthols. In combination with Naphthol AS-SW it is the fastest to light developing agent on this substantive naphthol, and produces a shade very close to the old Naphthol AS-Fast Red Salt GL combination. On Naphthol AS very severe exposure tests have proved its suitability for awnings. In regard to solubility, Fast Red Salt AL is not quite as good as the majority of the other salts, the maximum being 42 grams per liter.

I would like to draw your attention to the excellent stability of Naphthol AS-OL. On exposure to the air it does not show the same sensitiveness as do the majority of the other naphthols, and it can be naphtholated even without the use of formaldehyde in the naphthol bath. Only in such cases where the naphtholated material has to be stored for several hours before being developed, an addition of 30% formaldehyde on the weight of the naphthol should be applied.

Fast Red Salt TR and Fast Red Salt RL have also been recently brought into the market, and especially the latter should prove welcome for the dyeing of fast-to-light pinks. There were frequent objections to the use of Fast Red RL Base, which, in small quantities, required extreme care to diazotize.

Naphthols Combined with Other Dyes

In view of the great efforts that have been made to combine naphthols with vats, sulphurs, indigosols, etc., and in view of the great interest that has been awakened by the possibility of combining these, I should not overlook reporting to you about the more or less final results of the thorough and valuable experimental work. The principal difficulty in combining of the naphthols with vats or any other above-mentioned group of colors was the co-ordination of the various manipulations necessary for proper oxidizing and impregnating. We had soon to discard entirely the naphthols of less substantive character as far as simultaneous dyeing operation was concerned and to continue in our work only with those naphthols of higher substantivity, such as AS-SW, AS-TR and AS-BR, as the salt rinse after the prepare was essential to produce results. This salt rinse not only tends to remove surplus naphthol, alkali matter and hydrosulphite from the fiber but was also needed to assist in oxidation of the vat colors.

One Bath Not Practicable

The demand of the trade to produce heavy shades of brown, bottle green, maroon, etc., more economically than could be done with vats, created that "never-say-die" spirit in this respect. For continuous operation the matter had to be dropped, however; the best results were obtained in skein or machine dyeing, by choosing a small line of suitable vats or sulphur colors, regulating temperature, rinsing and developing. While we produced results in this way, consistency in obtaining exactness of shade was lacking. Therefore, we have come to the conclusion that the one-bath dyeing method had to be called impracticable in most instances. The only advisable and let us say "foolproof" method is to dye the vat or sulphur first, rinse with perborate or plain water respectively for oxidation and top with the naphthol and developing agent. By using, for instance, "GDC," Alizarine Indigo Blue or Indanthren Olive R as a bottom and topping with Naphthol AS-BG–Fast Scarlet Salt 2G, various shades of heavy brown with excellent fastness properties can be produced that represent a considerable saving in cost against straight vats in spite of the certain amount of additional labor involved. I would like to show you a package which has been dyed in this manner.

Here I would like to show you some experiments which should prove to be of good all-around fastness properties and which should fit in between developed colors and vats in regard to cost. I am speaking of combining certain naphthols with indigosols in dyeing. This bright shade of green has been produced with Naphthol AS-G and Indigosol O4B developed with Fast Yellow Salt GC. In this case, the Indigosol has been added to the naphthol bath. The dyeing has been carried out by impregnating the material with these two colors at 120° F. The naphthol solution was made up in the usual way and the indigosol added. An addition of sodium nitrite was made to the naphthol bath. After naphtholating the material was mangled and developed with Fast Yellow Salt GC, again in conjunction with sodium nitrite. After developing, the material was given a warm rinse at 140° F. with sulphuric acid to develop the indigosol on the fiber. Then rinsed and soaped as usual.

A certain line of shades can be produced by using naphthols in conjunction with indigosols, which should fill a gap by producing shades brighter and more economically and faster than developed colors. They furthermore dye very level, and satisfactory results can best be produced on jigs. Decided progress has also been made in obtaining clearer and more concentrated solutions with

such naphthols as heretofore required lengthy boiling to obtain a proper formation of the beta naphtholate. This is especially important for padding work and continuous operation.

By using various proportions of denatured alcohol in pasting up before the caustic solution is added, all naphthols can now without difficulty be dissolved cold. Only small additions of sulphonated castor oil or Nekal are necessary as binding agents. This decided reduction in the amount of oil previously used in pasting up the entire line of naphthols, furthermore, leads to better results in regard to fastness to crocking. The formation of aluminum soap on the fiber when diazo salts are used is practically done away with.

Package Machine Dyeing

This alcohol dissolving method is eminently important for package machine dyeing. There has been a discussion at the recent Southern meeting of this society on the same subject, leaving the issue whether naphthols can be satisfactorily dyed in regard to fastness to crocking somewhat in doubt. I can reassure our Southern friends that there is no trouble in obtaining entirely satisfactory results on any type of package machine and that a line of standard shades is being produced in this way for quite some time. For such machines where dehydration after the naphthol prepare cannot be carried out, only the most substantive naphthols that withstand an alkaline salt rinse can be used; while such types of machines having suction or dehydration devices allow the application of the entire line with the possible exception of heavy shades on less substantive naphthols. Shades of red, wine, maroon, Bordeaux, blue and black on AS-SW, AS-BR and AS-TR grounds are best dyed in the following manner: Paste up the naphthol with enough denatured alcohol to obtain a smooth paste, use not more than a pint of oil or 6 ounces of Nekal per 100 gallons, along with the necessary amounts of caustic and formaldehyde, exhaust at the end of the impregnation with Glauber or common salt, rinse after the impregnation until clear of surface naphthol, oil or alkaline matter, with not less than 2 ounces common salt per gallon, develop as usual, rinse thoroughly cold and hot and aftertreat at the boil in soda or caustic alkaline solution. Do not use soap on any type of package machine. On especially heavy shades, when diazo salts are used, give luke warm hydrochloric acid rinse after the developing action.

Before closing my paper I would like to submit to your study and application a few hints as to the use of these products on such textiles where adoption on a large scale has not yet fully developed.

Since the trend of fashion has opened a much wider field for the use of velveteens on both sides of the ocean, there has sprung up a demand for more brilliant and faster shades than could heretofore be obtained. I had occasion myself to experiment on a large scale in this respect with substantive naphthols. The entire dyeing operation has been carried out in the jigger in about two hours from start to finish. This short and simple procedure answers the domestic requirements for saving labor and still maintaining production. The results in regard to shade, fastness and economical reproduction were highly satisfactory. In the very important matter of fastness to crocking, however, the results did not quite reach the high standard of requirement. To approximate perfection in this respect, also, a certain amount of increased care and complication of the dyeing process cannot be avoided. In the first place the material has to be dried in between the impregnation and developing action. Secondly, it is necessary to submit it to a more mechanical lake removing aftertreatment than the ordinary jigger provides. This aftertreatment, of course, has to be carried out with full protection for the pile.

A few samples brought over from abroad show the beauty of naphthol colors on this line of material. No other colors will produce equal richness of shade combined with the high fastness properties. The perfect fastness to crocking of these dyeings has been obtained by carrying out the dyeing in the following manner: Naphtholated in the jigger, hydroextracted on the drums, dried in the hot flue and developed and finished in the jigger.

One of the German machine concerns has designed a very simple brushing device which can be attached to the regular type of jigger in such a way as to allow cleaning action before and after the passage of the piece on both sides of the material. This attachment consists of three rotary hair brushes and represents, no doubt, a great labor-saving device toward the obtaining of better fastness to crocking on all fast color work. For piece dyeing in general it should eliminate the necessity of rope-soaping afterwards.

Dyeing Weighted Silk

When I previously mentioned that naphthols on account of their pronounced affinity to the animal fiber could very well be dyed on real silk, I might say in addition that the same is the case with tin-weighted silk. A line of the heaviest shades on the standard card can be economically and in a fast way produced with naphthol combinations by carrying out the dyeing in the following manner: The naphthol is pasted up with alcohol, the minimum amount of caustic necessary to obtain the naphtholate is used (this amount is reduced about 20% from the amount used in cotton dyeing), ½% Nekal BX is used for binding and penetration purposes, and to safe-

guard the fiber, weighting, etc., additions of Protectol, sodium silicate and glue are made to the naphthol bath. The proportions should be about half the amount of Protectol as naphthol, one-quarter the amount of glue as naphthol, 15 c.c. sodium silicate 42° Be. per liter, and the same amount of formaldehyde as naphthol. The temperature of the impregnation should be 100° F. and dehydration and development should be carried out in the usual manner. Addition of 15 c.c. acetic acid 28% should be made to the developing bath.

Peroxide Bleach Fastness

There is one more modern fastness requirement which has caused a great deal of worry to the textile colorist and which has in many cases seriously upset calculations in combining fast colors. I am speaking of peroxide bleach fastness. The trade demand in respect to this fastness property has been rather severe and very few products are entirely unaffected.

There are a certain limited number of naphthol combinations which stand the following test:

9.3 grams sulphuric acid
7.2 grams sodium peroxide
6.0 grams sodium silicate
per quart of liquor
treated 6 hours at 180° F.

We submitted the entire line of the naphthol combinations to this test and report the following combinations as standing up very well:

Naphthol AS-G with Fast Yellow GC
Naphthol AS-G with Fast Scarlet 2G
Naphthol AS-TR with Variamine Blue B
Naphthol AS-SW with Fast Red RBE

The fastness of the following combinations can be called fair:

Naphthol AS-TR with Fast Red RBE
Naphthol AS-E with Variamine Blue B
Naphthol AS-SW with Fast Red KB
Naphthol AS-TR with Fast Red TR
Naphthol AS-SW with Fast Scarlet TR
Naphthol AS-BG with Fast Scarlet 2G
Naphthol AS-SW with Fast Black LB Base

All the other combinations change shade and character to a large extent.

It has been observed now and again that certain men with more delicate skin, when working with Naphthol AS products and their developing agents are affected by skin irritation. The cause of skin trouble of this nature may be looked for in the alkali impregnation liquor as well as in the diazo solution. The caustic soda in the naphthol liquor causes the hands to become chapped, and any foreign matter entering the cracked skin may cause inflammation. A more or less harmless rash appears.

As a precaution against trouble of this nature, the wearing of rubber gloves should be insisted upon. A well-proved remedy is to bathe the hands in a hot soap solution and then treat them with Dimazon ointment, which is manufactured by the Heilkraft Manufacturing Company, Boston, Mass. It is also of vital importance, especially in such cases where large quantities of diazo compounds are brought into solution, for those who are subject to affection, that they wear a mask of some kind to strain the air and prevent particles of dust from entering the breathing organs.

Any complaints that have come to us of this nature have all been remedied by following the above suggestions as well as by shifting labor—using men for this work who are not affected.

In conclusion, I feel that I have in my paper pointed out to you all that can be said to the colorists about this group of colors as far as recent developments and their application for dyeing are concerned. The very rapid progress that has been made in printing with naphthols and rapid fast colors, involves a large field of highly interesting developments, which in conjunction with the above, Dr. Hager will outline to you in a special essay. I thank you for your patience and kind attention.

Chairman Knowland—Our usual custom is to ask questions, but inasmuch as Dr. Hager's paper, which follows directly, is on an allied subject, it might be better to wait until Dr. Hager presents his paper. The next paper is on "Naphthol and Rapid Fast Colors in Printing." (Applause.)

. . . Dr. Hager presented his prepared paper:

Naphthols and Rapid Fast Colors in Printing

By Dr. H. E. Hager
General Dyestuff Corporation

UNDOUBTEDLY there has never been a group of dyestuffs in this country which has shown such a rapid and spectacular development as that of the Naphthol AS series. In December, 1925, I spoke on the subject at the annual meeting of this Association in Boston; at that time naphthols were in their very infancy, but the dyers were quickly attracted and the consumption grew with rapidly increasing steadiness. To-day there are certainly not many cotton dyers in the country who are not using naphthols. Inciden-

tally, whereas the supply one or two years ago was largely a question of importation, the wide range of naphthol products is now almost exclusively manufactured in our own country.

With the printer the development has taken a much less spontaneous course. It was only about a year and a half ago that the naphthols were taken up in a larger amount by the print works. However, the growing demand of the public for faster articles, which was undoubtedly the chief cause for the very busy times which the printer has had lately, has also helped the naphthol development tremendously. As a matter of fact, they were taken up during the last year by almost every printer in the country and in such ever-increasing amounts that the consumption is now actually larger in the print works than in the dyehouses.

Discharge and Resist Style

And now, gentlemen, where does the printer use these naphthols?

We can classify their consumption into three groups —the discharge and resist article, the rapid fast colors, and the naphthol print-on style. In my brief discussion I shall start with the smallest one, so far as consumption goes—i. e., the discharge and resist style.

I believe the reason that this article is the smallest is that our taste considers these effects on the whole as somewhat too obtrusive. Such very bright, orange, full red and scarlet shades discharged white or with colors are rarely found in the collections of the New York commission houses. The article is, however, not only coloristically interesting, but is in certain cases very attractive. In Europe, particularly in the eastern countries like Poland and Russia, this style has been much in vogue, and some patterns which I shall pass around will illustrate the rich effect. Of course, to produce such discharged articles the goods have first to be padded or dyed. They are then printed with the discharge paste for which only formaldehyde-hydrosulphite comes in question. Considering the very many combinations which are possible from the various naphthols and fast color salts, there are very few which cannot be cut to a white. Not suitable are all shades from Naphthol AS-G and AS-BR. In fact, the former one is so completely unaffected by oxidation or reduction that it is well suited for colored discharge effects. There are also a few other shades which are dischargeable and a few which produce a white only with additional help of such agents as leucotrope, anthraquinone and zinc oxide, but the majority of shades can be easily cut with Rongalite alone.

If colored discharges are wanted, direct, basic, chrome or vat colors can be used; but for practical purposes, only vat colors come in question, as they alone will equal the fastness of the ground. As I said, Naphthol AS-G is the only one which resists Rongalite. Practically all naphthol combinations, however, are stable to chlorate of soda, and for this reason they can be used in the chlorate discharge style. This is still used to-day by some printers in the discharge of Indigo, and the red-blue article on Indigo is generally produced to-day with naphthols.

Discharging to Clear White

One of the important discharge articles is white on blue ground. Fifteen years ago this was made usually by the so-called tannin discharge process. To-day it is generally produced by discharging Indigo or diazo ground. A part of it has, however, in the last years been replaced by Rongalite discharge of the combination Naphthol AS with Blue Salt B. This offers no difficulties in dyeing. It is cheap and is easily discharged to a clear white. It is as excellent to washing as the entire group of naphthol combinations, but stands behind the others in fastness to light. However, an aftertreatment with copper salt and acetic acid improves it considerably.

The new Variamine Blue Salt combinations are fast to light without such an aftertreatment. They are much brighter in shade; they give attractive bright shades even in light dyeings, and they discharge well, so they are bound to play an important part in future for this blue-white article.

The naphthol red-blue or red-white-blue style belongs to the class of resist work. Here we have first to pass the goods through a suitable naphthol solution, then print on a white resist which contains tin crystals and destroys the naphthol and a red resist which contains aluminum sulphate. Now we pad with the Blue Salt solution to which persulphate and copper chloride have been added. It has the effect that a coupling to blue will take place only at those parts which are not printed with the two resist pastes. It is an interesting style which can be carried out with perfect ease and reliability, and which is produced by several of our print works.

Another resist style is that of naphthol under vat colors, which is as yet not made in the United States. The goods are again first padded with a suitable naphthol, are then printed with a manganese chloride resist containing one of the fast colors, and are finally dyed with vat colors. This article is exceedingly bright and fast.

Naphthols Under Aniline Black

Finally, there is another resist style which has only recently been developed, and that is that of naphthol under Aniline Black. This article has so far been made with basic or vat colors. The former have the brilliancy, but are much too loose, and the latter do not show up quite bright enough and, besides, are not easy to produce properly on account of halo formation. Naphthols under Aniline Black show not only strikingly bright effects but are very fast at the same time. That style is made by padding the goods with aniline solution, drying, and printing with zinc oxide-caustic resist which contains a suitable naphthol, then aging in dry steam and finally padding in a fast color salt solution.

The next group is that of the rapid fast colors. They were the first naphthol products which the printer took up and, because of their very simple application and their bright and fast shades, they have quickly found favor with large and small printers alike. They are used on machines, with blocks, stencils or screens, in spraying and in yarn printing; they are suitable for all cotton fabrics, for most rayons, Bemberg and Tubize, but they do not print very well on silk and not at all on Celanese. Their constitution is not new to you. They are mixtures of certain naphthols with the nitrosamines of certain bases in an alkaline medium. Only the base for yellow, marketed as Rapidogene, is not such a mixture, as that is not stable. Rapidogene is just a nitrosamine, and to form a rapid fast color the addition of some naphthol is needed; if that is, for instance, AS-G, a very valuable shade of yellow is obtained and with AS-BG a brown. There is also a Rapid Fast Yellow, the 2GH brand, which was recently put on the market. It is bright and stable, but after aging loses some of its brightness. The range includes further an orange, four very fine reds, a Bordeaux and a blue. A good black can be made from mixtures; a very fine scarlet will soon be given out—in fact, the line is being built out more and more.

Rapid fast colors come in paste form; some of them were originally not very stable, but to-day that difficulty has been overcome. The Rapidogenes and the H brands are even stable as printing pastes. It was quite a drawback formerly that such printing pastes had to be used the same day on which they were prepared; they would at times become foamy and deteriorate after a long run on the machine. That drawback has been eliminated; print pastes from the H brands can be kept in perfect condition for several days.

As the name implies, rapid fast colors are easy to print and are fast. The preparation in the color shop means merely a stirring of the paste with water and a lubricant like Monopole or machine oil, and mixing this with the gum starch thickening. A short aging or a long hanging will fix the prints, and a subsequent hot acetic acid bath will develop the shade. A final hot soap bath possible on the rope soaper will bring out the brilliancy.

Machine printers obtain the fixation by aging, as a hanging is out of question for space and production reasons. The Rapidogenes and the H brands withstand this aging without a change of shade. The others will be practically unaffected if a small amount of neutral chromate is added to the print paste.

The fastness of this group is, generally speaking, very good. All the shades withstand a frequent and hard-boiling soap treatment without any alteration; most of them are fast even to a severe exposure to chlorine. The fastness to light as a whole is as good as that of the best direct colors. Some shades range even with those of the Indanthrenes. No wonder, therefore, that the printer likes to incorporate them in his patterns wherever he can, particularly as they are only about half the price of vats.

The range of rapid fast colors is, however, not complete. We have no green, no bright blue, no violet and no brown. The way out of this disadvantage was bridged over by the help of Indigosols. They are entirely indifferent to the rapid fast colors; both can be mixed in any proportion and can be printed according to a modified nitrite process. The Indigosol O4B brand alone will almost fill the gap to a complete range of shades; by itself a bright blue, it will give brilliant greens with Rapidogene-Naphthol AS-G, violets with Rapid Fast Bordeaux, and in a similar way browns, olives, etc. The print paste contains the nitrite; the goods are aged and passed open width through a hot acid bath. This acid would ordinarily be acetic for the rapid fast colors, but acetic would not develop Indigosols; it would be sulphuric for the Indigosols, but that again would not do for the rapid fast colors, so one chooses oxalic or formic acid, which works very successfully.

Combinations with Other Classes of Dyes

Of almost greater importance than in straight patterns are the rapid fast colors in designs together with basic, chrome and vat colors. As an example, let us take a pattern of four or five basic colors; the reds—i. e., the rhodamines—are the weakest link. They are the loosest in washing and the most expensive. A rapid fast red printed in their place will practically equal their brilliancy, be very much faster and quite a bit cheaper. In patterns which touch or overlap, one must, of course, use a few precautions, as otherwise the alkaline rapid fast color would interfere with the

ordinarily acid basic color; for such work the acetic acid is, therefore, cut out and the basic color is dissolved in a neutral solvent such as glyezine.

In a similar way rapid fast colors are fitted into the commercially fast chrome line. The weak links here are the yellows, which are rather dull, and the Alizarine Reds, which require special care and heavy steaming; Rapidogene Yellow and the Rapid Fast Reds take their place; they print very well next to chrome colors, particularly the gallo types, which do not require a prolonged aging. For such work it is advisable to add a very small amount of caustic to the rapid fast colors as an offset against the slightly acid chrome color, and to use a little neutral chromate to fortify the rapid fast colors against a dulling from longer aging.

Rapid fast colors can also be printed alongside of vat colors or even of Aniline Black, if the patterns do not touch, although in the latter case a little extra care is needed.

Unfortunately, a rapid fast color cannot be made from every naphthol and every base. It is this fact which was particularly instrumental in the tremendous development of the last style, which I want to mention, that of the naphthol print-on article. As a matter of fact, this process is sold predominantly for the one very bright, fiery combination, Naphthol AS-D plus Fast Scarlet Salt R. This red is so unusually bright that it cannot be equaled by anything else and that it stands out superbly in any pattern in which it is used. The style is, in short, just the padding of the goods with the naphthol solution, a drying on the cans and a subsequent print-on with the thickened color salt.

The naphtholation or prepare is carried out with the solution of a suitable naphthol. There are five brands which can be recommended for this process, as they can be washed out on the unprinted parts to a good white. The best one, however, and the one most universally used is Naphthol AS-D. This does not only wash out to the best and practically perfect white, but all its combinations are in no way changed in shade when subjected to aging. We will, therefore, only consider Naphthol AS-D in this discussion. A padding solution is made by using about 1¾ ounces per gallon; this is pasted with approximately an equal amount of alcohol and an equal amount of caustic 34° Be., dissolved very easily with boiling water and brought up to 1 gallon with cold water. Formaldehyde, which is usually added for dyeing to increase the stability of the prepare, is omitted by the printer, as it tends to give a poorer white in both the print-on and the discharge style. Such naphthol solutions are very stable; should they precipitate after long standing they need merely to be boiled up again with a little caustic. The padded goods are dried at not too high a temperature on the cans. They can now be kept for many days, but should preferably be protected by covers against sunlight or acid fumes, which would cause a decomposition of the naphthol sodium salt. It was found, however, that freshly prepared goods will wash out to a purer white, which makes it advisable not to store the naphtholated pieces for more than three or four days.

Printing with Fast Color Salts

The goods are now ready for the printing with the fast color salts. Of course, a diazotized base could be used instead, but it is regarded in the United States as too troublesome and not worth the very small saving to bother about the somewhat complicated and unpleasant process of making up such a diazo solution. The printer uses, probably without exception, only the fast color salts; these are available from the majority of the bases—to be precise, from twenty-two bases there are only five from which one has so far not succeeded to make the corresponding salts. All are easily soluble in water, and all are very stable if they are sufficiently protected against moisture and heat. A printing paste is made from the waterous solution of the salts and a suitable thickening. Potato starch or dextrines should not be used; they will soon tend to decompose. The best to use is gum tragacanth alone or in combination with wheat starch. The range of shades available to-day includes an orange, a scarlet, various reds, the old Blue Salt B and the new, bright Variamine Blue Salt and two blacks. The new violet base has not been brought out as yet as a color salt. The print pastes are almost immediately fixed on the prepare; an aging is, therefore, not necessary. Subsequently the goods should be passed first through a very hot dilute caustic bath, which will immediately clear the ground, and then through a boiling soap bath which will brighten the shade and at the same time improve the fastness to light, chlorine and rubbing.

If other shades besides the available color salts are required, one resorts to vat colors. These are printed alongside from the usual not pre-reduced potash paste in patterns which do not touch, as otherwise halos would hardly be avoidable. Such combination patterns must, of course, be aged, as is customary for vat colors. This style has become extraordinarily popular, particularly for wash goods, and if you walk through the department stores you can find hundreds of patterns which are produced in this way.

Finally, I wish to mention a modification of this style. Instead of preparing with naphthols and printing on the color salts, one can also print various naphthols from thickened solutions and develop by padding

the goods through a suitable color salt solution. This process works a little cheaper and allows the possibility of producing a bright yellow. However, it cuts out the use of blue salt and black salt, as these will stain the white ground.

My object has been to give you a short survey of the various styles in which naphthols are used, particularly in our American print shops. The limited time does not permit me to go into details or to exhaust by far all the possible variations which the printer can use with these products. However, I shall be very pleased to try and answer any questions which you may wish to ask.

Discussion on Application of the Naphthols

Chairman Knowland—I am quite sure there are some here who would like to ask questions of Mr. Marsson and Dr. Hager.

Mr. Haas—One question I had in mind was whether, if you have some color in your material, you first have to treat the material with Naphthol AS Prepare and then print it with a Red Scarlet Salt.

Dr. Hager—You mean, do you have to first prepare the goods and then print?

Mr. Haas—For example, we might have a black material on which we want to print a red. Would we have to naphtholate the material first and then print it?

Dr. Hager—Yes, but if your design is small it would be cheaper for you to print on Rapid Fast Color, although as I said before you understand that this very bright scarlet cannot be obtained from Rapid Fast.

Mr. Haas—You couldn't incorporate your Naphthol AS right in your dye bath, could you?

Dr. Hager—That would depend on the dyeing. If you had, for instance, a light vat color ground, it could undoubtedly be done.

Mr. Haas—The trade demand now for red which is fast to crocking could be worked in a discharge, then?

Dr. Hager—For discharge?

Mr. Haas—Yes. For example, if you have a blue or a black material and you want to incorporate a red design on it, usually basic colors are used, but they are very unsatisfactory—

Dr. Hager—No, for the ordinary discharge work we cannot, of course, use the naphthols. They are not stable to Rongalite discharge.

Chairman Knowland—Are there any further questions?

Dr. Flynn—Just why have you adopted alcohol for wetting out?

Dr. Hager—It is very much easier, Dr. Flynn. You get your solution without any trouble at all, and I believe the printers have gone over more and more to it.

Dr. Flynn—Was there some specific objection to the use of sulphonated oils?

Dr. Hager—Absolutely not.

Mr. Gerry—I should like to know how clear a white you can get on some of those Naphthols.

Dr. Hager—I think the designs show that. There are some very heavily dyed patterns in that book, with very large whites on them, and the whites are very good.

Chairman Knowland—Are there any further questions?

Mr. Hellmuth—Mr. Marsson, I want to ask, if you dye a yellow on silk with ASG and Benzolate, do you get even results, in open bath?

Mr. Marsson—Of course, it is advisable to exhaust your Naphthol ASG for silk as well as for cotton with Glauber salt in the bath.

Mr. Hellmuth—How long do you let it stand?

Mr. Marsson—On silk I would keep it at 80° F., not more than that, with necessary additions of fiber protecting agents. The liquor keeps for a long period.

Mr. Hellmuth—I have noticed on heating of ASG and then applying the Fast Yellow Salt GC, that it comes on very rapidly and we obtain uneven results.

Mr. Marsson—You should be sure to have an excess of diazo compound in your liquor, and in order to obtain a clear yellow on silk you have to use an additional amount of acetic acid in your immersion bath, too. All these things tend to level it.

Chairman Knowland—Are there no further questions? It is very rarely that we have two papers on such dissimilar subjects as ours are to-night. We have been talking only about the chemical phase of our industry. Now we have something strikingly new, and we will just turn our interest over to the physical aspect of textiles.

It gives me great pleasure to introduce our next speaker, Mr. Scott Huntington, who will speak on the application of the Texilscope. (Applause.)

Fiber Identification with the Texilscope

By Scott Huntington

THE hour is getting somewhat late. I shall make my remarks very, very brief, touching on what I believe to be a new theory, and that is the conductivity possessed by the various animal, vegetable and synthetic fibers.

In order to ascertain these varying degrees of conductivity, if any—and in the case of the animal fibers there are none—I have evolved an instrument based upon the old electroscopic principle, but quite a radical modification of it which I call the Texilscope. It is an instrument, as you see here, having a chargeable member in the center, which I term the detector, and these two

sliders have their ends in the interior, with two cusps holding two strips of pure gold which will assume a horizontal position as soon as you charge the central member, the detector, with an electrostatic current. The electrostatic current is generated with this small piece of ebonite by frictioning it against an animal fiber and by moving it downward upon contracting this detector. You will observe, with the assistance of the film, that the indicators that I speak of are those two strips of gold which assume a horizontal position. The instrument being charged positively and, the maintenance of those indicators being caused by induction, nothing will discharge them unless you withdraw the charge by contacting to that detector a conducting material, and that will be one of the synthetic fibers or any of the vegetable fibers, but none of the animal fibers.

That discharge takes place generally in less than two seconds. In some cases it takes as long as thirty seconds.

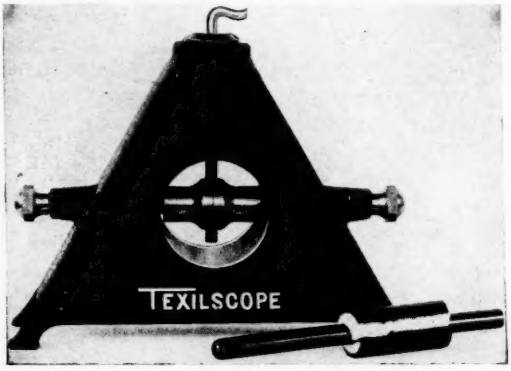
The cause of that is relative conductivity. I don't presume to trespass upon the steps of Professor Einstein in his theory of relativity, but relativity in the case of conductivity is very interesting, especially among the vegetable fibers, and among the vegetable fibers the group of cottons is probably the most interesting. The reason for that, which is the theory I am advancing, incidentally, is that cottons grown in certain regions, like the upper Sudan, the Uganda, the Imperial Valley (in the drier regions, in other words) possess much less conductivity than the cottons grown in the Mississippi, the Granges, the lower Nile, the Yangtze-kiang, and the other moist regions. Their cellulose structure, I contend, is different on account of their retention of greater moisture making them greater conductors. That degree of conductivity is manifest upon this instrument, by causing those indicators to descend with a rapidity proportionate to that conductivity.

As the instrument is entirely too small to demonstrate it this way, I have taken the liberty of having a film made which will be projected on the opposite wall, so that you can observe the functioning of this instrument and the rapidity of descent of these indicators that I have described, on an enlarged scale.

. . . Mr. Scott Huntington then showed this film, in connection with which he made the following remarks:

It is always best to remove a thread from the warp and the woof alternately in making your tests.

You should also beware of not running the thread between your fingers when making these oscillatory and thread tests, otherwise the inherent moisture of our fingers being transmitted to the fiber, if it happens to be an animal fiber, will, of course, temporarily cause that to become a conductor. So simply handle your thread by the ends.



Though the qualitative test is quite adequate the quantitative test is approximate.

The speed of descent of the indicators is always in proportion to the amount of the conducting or extraneous matter mixed with the animal fiber.

This oscillatory test is very, very interesting and I am pointing to the lower end of the thread so that you will observe whether it becomes attracted or deflected from the detector.

You will observe the Viscose thread there being attracted at the top. In the thread test you will get a marked descent.

This is the oscillatory test of the acetate which you will observe is swirling around and around the detector, but won't go near it—a peculiar characteristic of the acetate which distinguishes it from all the other rayons.

Always discharge the Texilscope so as to make sure your indicators are down before closing the sliders.

Discussion on the Texilscope

Chairman Knowland—I am sure that there are a good many questions you want to ask Mr. Huntington.

Herbert Grandage—What is that instrument worth?

Mr. Huntington—Thirty-five dollars.

Dr. Flynn—How about sizing and softening materials in the Texilscope?

Mr. Huntington—It is advisable to remove it a little before your tests.

Dr. Flynn—I should think it would be quite essential to remove it.

Mr. Huntington—Yes, but due to the extreme sensitivity of the instrument, when you remove your thread unraveled, you tear it out and make your oscillatory tests with one of the several filaments. It is quite difficult to believe that the sizing has penetrated to the very core. Therefore, you will be quite safe in making your tests by one of the filaments.

Dr. Flynn—I should think that perspiration dropping through your fingers would injure the reading.

Mr. Huntington—No. I would strongly advise you, if you are about to test a sized thread, to ignore the superficial sizing, but simply unravel your thread and get right into the filament and test it by the oscillatory test. In that manner, there won't be the possibility of transmission of perspiration to at least the interior core of the thread. It would be quite clean.

Mr. Pollock—The principle is based on the length of time it takes for the indicators to drop?

Mr. Huntington—The principle of what?

Mr. Pollock—Of your test, determining what the fiber is.

Mr. Huntington—No, the descent of the indicators gives you two indications: the amount of the weight, if it happens to be a weighted silk, and also the character of the rayon, if it happens to be one of the three, excluding always the acetate.

Mr. Pollock—Suppose you have a spun silk with a Viscose thread running through it, a mixture in the one thread.

Mr. Huntington—In that case, if you place the entire thread, without unravelling it, on your detector, you will get a neutral reaction, that is, no descent of the indicators. If you have a suspicion as to the construction of that thread, do as I suggested to the other gentleman: unravel it and get on the inside and if you have a rayon thread in there or a rayon filament you will detect it.

Mr. Pollock—According to the time it takes to drop?

Mr. Huntington—No, from the oscillatory test, whether it be attracted, oscillated, or not.

In order to cause a descent, it is essential to withdraw the electrostatic current or charge, which you have transmitted to it at the time you charged, for you observed every time the test is completed, I recharge the instrument. You all observed that. Therefore, to withdraw that charge, you must have sufficient conductivity in there, in the fibers or thread that you are testing.

Mr. Pollock—You say it is best to remove the film of sizing, or whatever it may happen to be?

Mr. Huntington—Not necessarily, because there may be the danger, as the gentleman intimated, of the perspiration from your fingers being transmitted to it while doing so.

Mr. Pollock—Suppose you don't use your fingers, wash it off, and then dry—

Mr. Huntington—Then you may attempt it quite safely, but still it is safer to unravel your thread and perform your oscillatory tests with the filaments. Then you are quite safe.

Mr. Grandage—Can the amount of moisture in two samples be indicated there?

Mr. Huntington—Moisture content?

Mr. Grandage—Suppose you had two fibers which you believed to be the same, one of which contained more moisture than the other. Would the instrument record accurately both fibers? Could you identify both of them the same, or would the moisture content affect them?

Mr. Huntington—There are some factors to be considered in making that test, such as if the threads that you are about to test were under the same atmospheric conditions, at the same time, if they are the same ply, and if they were handled in the same manner. It is quite obvious that if you have a large thread, four-ply, compared to a one-ply, the surface contacting area of the former will be four times greater than the latter. Therefore, you will withdraw your charge four times faster.

Mr. Pollock—Then, again, the denier would have a lot to do with that, wouldn't it? That is what you would have to know then. You would need to know the denier of the yarn.

Mr. Huntington—Yes, theoretically. But in practice it hasn't been found to be a deterrent factor.

Mr. Pollock—Will a 300 weight any differently than 150?

Mr. Huntington—The difference will be so small that it is not worthy of consideration because, after all, as I intimated some time ago, wherever you have any doubts, by unraveling your thread and making your oscillatory test with one filament, the filament size of the former will be about the same as the latter. And as to their relative conductivity they are so approximately similar that for all practical purposes you will be quite safe.

Mr. Pollock—With a square of goods like the one you showed on the film, would that show it up, if it was just the one fiber? If it was just composed of one, could it show up the other fiber in there? Would there be an indication?

Mr. Huntington—No, not on the piece test. That is why it is stated that it is purely an indicative test. If you want a definitive test you must perform the thread or oscillatory test.

Mr. Grandage—Would you be able to get the indication for the various classes of cottons there between a Sea Island and an Egyptian cotton, for instance?

Mr. Huntington—You can, but that comes with close study. The human element, of course, enters to a marked degree. If a man is a close observer he will, and quite readily, and when I say "readily," I mean within two to three weeks, familiarize himself quite thoroughly about that.

Mr. Grandage—By which test would you get that indication, the contact test with your single thread?

Mr. Huntington—Both. But I believe that if you

confine your experiments to testing warehouse stock you will obtain better results.

Mr. Kapp—Could you use your Texilscope in the case of overbleached fibers to determine the amount of oxycellulose or hydrocellulose, and things of that kind?

Mr. Huntington—Yes, but that question falls in the same category with this other gentleman's. It is a question that involves the human element, your own observation. The findings, though discernible, are such that you cannot very well print them in an instructional booklet and convey any intelligence to the reader. The main claim made for the Texilscope is that it will give you a definitive, qualitative test, yes, but not about sizing, the dressing, and so on; as to the fiber itself, whether it be animal, vegetable, or synthetic, or a mixture of those three. That is the prime function of the instrument.

Effect of Humidity

Mr. Herrmann—May I ask to the influence of humidity—weather?

Mr. Huntington—Humidity is a very important factor. But if we have 95 to-morrow when we enter our lab, and the preceding day we left a number of samples, we know that that 95 is going to affect all those samples similarly. So if it took you to-day, with only 60, say, two seconds to obtain a complete descent in making one test of the cotton, to-morrow it is quite likely that you will have the same descent in half a second. But that does not destroy the quality of the fiber.

Dr. Harold—Isn't there some variance in the power of the charge? How may those indicators in the beginning prove that there is equal dischargeability? In other words, if you rub the ebonite against your clothing for a long period, then allow it to rest on the cabinet above, won't you get, in some cases, a much greater charge? In other instances, with equal horizontality may it not take longer for those leaves to drop?

Mr. Huntington—That is quite an intelligible question. (Laughter.) But I believe I have overcome that because, of course, your charging principle remains constant. The surface size of your detector also is a constant. When you familiarize yourself with charging your instrument, you subconsciously exert a similar pressure, and your charge is virtually constant. If you should perchance charge it once and for some reason, through forgetfulness, or something, charge it a second time, I have found that the detector, being receptive for only a certain amount of charge, will radiate all about its exterior, its periphery, the, what I will term, superfluous charge, and it will retain just about that much, probably one-half of one micron—a very small amount. You are handling a very, very small quantity of current.

To prove that to my satisfaction and to the satisfaction of others, I charged it once. I took the thread and noticed how long it was before I received a complete descent, discharged it, charged it again, charged it for the second time, taking the same thread, and I observed that descent took place within the same time. So I believe that the theory is proper.

Mr. Hadley—Do you time it with a stop-watch or anything of that kind?

Mr. Huntington—Yes. When I say "the same," I mean within a third of a second. For practical purposes I believe we can accept that as accurate.

Testing Celanese

Mr. Slough—How about a piece of Celanese that has been treated with caustic soda? What is the difference between the ordinary acetate rayon and that which has been treated with caustic soda?

Mr. Huntington—Instead of having a deflection, such as you observed on the illustration, you will observe an attraction, but quite a mild attraction, not nearly so marked as you observed in the Viscose case. You observed how it just bent toward it. It won't be that marked.

But those are some of the finer points that, as I mentioned before, your own observation will show.

Mr. Herrmann—Reverting to this matter of humidity, years ago I had occasion to play with a static machine and I recall days in the summer when it was impossible to collect any static charge whatsoever. Am I wrong in assuming that you may have trouble some days in accumulating any charge in your ebonite rod?

Mr. Huntington—Yes, you are wrong. I have overcome that, after many years. I have been at this thing for eight years. I will admit that the first four years, yes, the first five years of these eight gave me considerable trouble. Eventually, I evolved a method of structure coupled with the use of certain materials which in combination, I believe, has virtually eliminated—not completely, because Mr. Moisture is always with us, but for practical purposes has virtually eliminated—that element as an element of danger.

Chairman Knowland—Are there any further questions you would like to ask Mr. Huntington? If not, the hour is drawing late and we will call this meeting to a close.

Mr. Grandage—I move we give the speakers of the evening a rising vote of thanks.

. . . The motion was seconded and carried. (Applause.)

FIFTY-SECOND RESEARCH COMMITTEE MEETING

March 8, 1929

THE fifty-second Research Committee meeting was held at the Chemists' Club, New York, at 4:05 p. m. Friday, March 8.

The following were present: Chairman Louis A. Olney, E. H. Killheffer, W. S. Williams, Dr. Walter M. Scott, William R. Moorhouse, Hugh Christison, Ralph F. Culver, William H. Cady, Richard B. Earle, William D. Appel, Prof. E. C. Bertolet, Dr. Joseph F. X. Harold, Ralph E. Hadley, Harold M. Chase, F. R. McGowan, Arthur E. Hirst, Ephraim Freedman, Donald S. Ashbrooke, Dr. Oscar R. Flynn, Henry F. Herrmann, Dr. Hans Meyer, Ed. F. L. Lotte, William C. Smith and Alex. Morrison, Secretary.

William D. Appel, Chairman of the Sub-Committee on Research Survey, reported that his committee had not started work, but expected to get under way in a few days.

F. R. McGowan, being the only member present of the Sub-Committee on Rubberized Textiles, reported some progress.

William H. Cady, Chairman of the Sub-Committee on Fastness to Light, reported progress in the selection of new fastness-to-light standards.

Hugh Christison discussed the fastness-to-perspiration research work he had carried on, especially in regard to reagents and practical operation of the tests. It was agreed that he should make a series of tests on selected colors in the usual method his committee had adopted, and that the same colors be tested by Mr. Freedman in his laboratory at Macy & Co.'s in an incubation oven, and results compared.

Mr. Christison reported on washing fastness standards for woolens and worsteds, and it was agreed that these tests be taken up by Mr. Smith, our research assistant, and completed as soon as possible.

Dr. Joseph F. X. Harold and Ephraim Freedman, the committee appointed to investigate waterproofing tests, gave a very excellent and lengthy report on their progress in this investigation to date.

Dr. Harold gave a sort of bibliography of many different methods of tests that have been used to test the waterproofing, or water resistance, of different kinds of fabrics, briefly outlining the general procedures. He also exhibited two pieces of apparatus he had used in his own laboratory for other purposes which he felt might possibly be adapted to our tests with slight changes.

Mr. Freedman very ably described several tests made in Macy's laboratory, and discussed results with different kinds of shower sprays.

The committee has done very excellent work to date and expects to be able to make a written report of its work at the next meeting.

Chairman Olney read to the committee a number of subjects suggested for research on the questionnaires that had been sent out by the committee and returned. A large number of these questionnaires have already been returned, but it is hoped we will receive them from more members.

The next meeting was tentatively set for April 12 in Boston.

The meeting adjourned at 6:10 p. m.

ALEX. MORRISON, *Secretary.*

MARCH MEETING OF THE RHODE ISLAND SECTION

THE March meeting of the Rhode Island Section was held on Friday evening, March 29, in the rooms of the Providence Engineering Society.

On motion duly made and seconded, Allison R. Fletcher was unanimously elected to serve on the General Nominating Committee for this year.

Dr. William H. Cotton, of the General Dyestuff Corporation, gave a very interesting talk on "The Application of the Insoluble Azo Colors in Printing."

Sixty members were present.

WINTER MEETING OF THE SOUTH CENTRAL SECTION

THE winter meeting of the South Central Section was held Saturday evening, January 26, at the Patton Hotel, Chattanooga, Tenn. Due to the absence of Chairman P. F. O'Neil, Vice-Chairman L. L. Bamberger presided.

During the business session the following officers were elected to serve during 1929: Chairman, L. L. Bamberger; Vice-Chairman, R. B. Sloan; Secretary, I. V. Sheffield; Treasurer, T. R. Smith.

Shortly after the meeting T. R. Smith found it necessary to resign, due to a change in residence, and the Chairman appointed H. A. Rodgers to fill the office of Treasurer for the year.

After the short business meeting, Prof. Charles E. Mullin, of Clemson College, gave an informal but very complete talk on "The Use of Hydrogen Ion Control in the Textile Industry." After outlining the fundamental theory, Dr. Mullin explained the electrometric and colorimetric methods of determining hydrogen ion concentration, giving actual demonstrations of the latter method.

At the close of Dr. Mullin's remarks a very interesting discussion took place on the practical use of hydrogen ion control in the industry, and much time was spent in discussing various other theoretical questions, particularly on the possibility of substituting formic for acetic acid in dyeing.

I. V. SHEFFIELD, *Secretary.*

Changes of Address

Bannan, Francis E., Box 324, Garnerville, N. Y.
Bell, Edward B., 64 Humphrey Street, Lowell, Mass.
Dawson, Jr., John, 70 School Street, Fall River, Mass.
Duhring, Edwin L., 6031 Hazel Avenue, Philadelphia, Pa.
Eichlin, A. S., 4550 Malden Street, Chicago, Ill.
Feimster, Jr., Andrew, 1341 Third Avenue, Columbus, Ga.
Forsdale, Oscar H., Chestnut Street, Exeter, N. H.
Green, James, 19 Myrtle Avenue, Greenwood, R. I.
Hubbard, Clarence C., Silver Springs, Md.
Jaeger, Albert, Thies Dyeing & Processing Co., Inc., Central Falls, R. I.
Kelly, Jr., Wm. J., 1202 Chestnut Street, Chattanooga, Tenn.
Kopf, John W., 605 W. Washington Blvd., Chicago, Ill.
Macormac, Alfred R., Clemson College, Department of Textile Chemistry and Dyeing, Clemson College, S. C.
McCulloch, Hector, 916 Alexander Avenue, Upper Darby, Pa.
Mease, A. J., 307 Catherine Street, Syracuse, N. Y.
Meisenheimer, Todd B., 819 Johnston Bldg., Charlotte, N. C.
Mork, Harry S., 60 K Street, South Boston, Mass.
Morris, Merrill G., 10 Walnut Street, Baldwin, N. Y.
Pardue, Jr., W. A. Beaver Chemical Corporation, Damascus, Va.
Pickens, W. I., Box 1545, Chattanooga, Tenn.
Putnam, Leverett N., 33 Holton Street, Danvers, Mass.
Radford, G. S., care of Belding Heminway Company, 180 Madison Avenue, New York City.
Schwarz, H. F., 10 Brunswick Avenue, Saylesville, R. I.
Sherburne, Ernest A., Box 412, Providence, R. I.
Sjostrom, C. V. G., 58 Church Street, Ware, Mass.
Skalnik, Karl M., 18 Pasadena Place, Hawthorne, N. J.
Smith, Thomas R., Thies Dyeing & Processing Company, Belmont, N. C.
Spuhler, Wm. H., Ultra Chemical Works, Hawthorne, N. J.
Stehle, Chas. G., Crestmont Avenue, Torresdale, Philadelphia, Pa.
Stewart, William W., 93 Gates Street, Lowell, Mass.
Temple, Chas. A., 10 Clinton Street, Woburn, Mass.
Walker, James C., care of Sandoz Chemical Works, Inc., 36 Purchase Street, Boston, Mass.
Ward, George C., 12½ Waverly Terrace, Cumberland, Md.
Wood, P. J., Oriental Silk Printing Co., Paterson, N. J.
Zillessen, Ernest J., P. O. Box 322, Passaic, N. J.
Zisman, Louis S., Gotham Silk Hosiery Company, 580 First Avenue, New York City.

Applicants for Membership

Active Membership

Barrett, Edward Clark, director of merchandise, Testing Laboratory, Abraham & Straus, Inc., Brooklyn, N. Y. Sponsors: D. P. Knowland and Jos. S. Lange.

Bragg, C. C., in charge of experimental laboratory, Wayne Knitting Mill, Knitters Avenue, Fort Wayne, Ind. Sponsors: A. T. Brainerd and M. A. R. Selisch.

Britt, Harry H., dyer, Louis Terry Corporation, 500 S. Throop Street, Chicago, Ill. Sponsors: Gordon M. Markle and J. G. Stott.

May, William, salesman and demonstrator, Senco Color & Chemical Company, 287 Broadway, New York, N. Y. Sponsors: Otto F. Graenicher and W. H. Wingate.

Schlayer, Fred, dyestuff salesman and demonstrator, Progressive Color & Chemical Company, 25 Howard Street, New York, N. Y. Sponsors: David Aibel and D. P. Knowland.

Tainsh, Alexander C., Jr., salesman, John Campbell & Co., 78 Fountain Street, Providence, R. I. Sponsors: Frederic A. Prisley and Alex. Morrison.

Waid, Stanley B., boss dyer, F. Y. Kitzmiller Hosiery Company, Fourth and Elm Streets, Reading, Pa. Sponsors: Karl Krug and Theodore Z. Kramer.

Junior Membership

Brewer, Robert W., salesman and demonstrator, Liberty By-Products Works, Inc., 372 Main Street, Belleville, N. J. Sponsors: Ernest F. Zillessen and Ernest A. F. Zillessen.

Otto, Frederick E., textile chemist, Gaede Silk Dyeing Company, Paterson, N. J. Sponsors: Robert H. Gaede and P. H. Stott.

ATTACK ON AMERICAN DYES SILENCED

(*Continued from page 248*)

trade was not so color conscious at that time as to-day. They did not ask for better colors at that time, because they did not know what better colors were obtainable.

We heartily support Mr. Thompson in his views that the trouble with the color situation to-day is not with the American dyestuff manufacturer nor with American dyeing. There is no doubt that plenty of American dyestuffs of satisfactory fastness exist to-day, and that plenty of American dyers exist who can satisfactorily apply them.

The chief trouble with the color situation is that someone in the distributing chain doesn't want to pay the price for fast colors. Whoever is willing to pay the price can, without a doubt, get what they want.

* * * *

Fastness Controlled by What Manufacturers Will Pay, Dr. Killheffer Holds

DR. E. H. KILLHEFFER, president of the Newport Chemical Works, made the following sharp rejoinder to the opinions expressed by the dress manufacturer:

"It is difficult to believe that the dress manufacturer quoted in the Daily News Record of March 20 is really sincere in what he is quoted as saying.

"However, assuming absolute sincerity on his part, we are forced to the conviction that he is quite ignorant of the facts, else there would not be the unwarranted and grossly unfair indictment of an industry.

"The fact is that this dress manufacturer can have his goods dyed or printed with just as fast colors as he is willing to pay for. And right here is where a lot of trouble starts, because the fastness of the colors used is controlled by what this dress manufacturer is willing to pay. In other words, the good ladies who purchase the dresses are perfectly willing to pay the small difference in cost if given the chance. Very often this actually very small difference in cost is a very large one by the time it reaches the ultimate purchaser.

"For any dress manufacturer to try to screen himself behind the American dye industry is, putting it mildly, pretty silly, and for two very good reasons:

"1. The American dye industry is producing dyes second to none in point of fastness. All informed textile men know this is true.

"2. There are no restrictions against the importation of any dyes, whether fast or fugitive. If any manufacturer thinks German dyes are better there isn't anything to prevent him from buying them from the German agents here.

"The only true characterization of the dress manufacturer's statement that before the war when German dyes were used it was never necessary to question the character of a color, is that it is unintelligent and most inaccurate propaganda, and nothing else.

Pre-War Goods Would Not Pass To-Day

"The United States, and in fact most of the world, was never as 'color-fast' conscious as it is to-day. Goods that passed muster before the war would never do so to-day. Any textile manufacturer will confirm this statement. That we are much more 'color-fast' conscious, and also that the claim of better fastness with all German colors before the war is purely mythical, can both be well illustrated by calling attention to the fact that in the last fiscal year before the war, 1914, a little over two million pounds of vat colors other than Indigo were imported, whereas in 1927 six million pounds of vat colors other than Indigo were produced here in the United States.

"Another comment offered on the same subject was to the effect that the tariff keeps vat dye prices up. To the contrary, it has brought them down year by year, as the records of selling prices will show. Without the tariff, and consequently American production, I wonder how much the prices would have come down!"

* * * *

A Dyestuff Myth Easily Exploded

By George H. Johnson

Director of Research, Laundryowners' National Association, in "The Laundry Standard"

THERE are too many salesgirls who have an inferiority complex when it comes to goods that have been dyed or printed with American colors. One of the stock-in-trade excuses of many salespersons to-day, when discussing colors, is the asserted inferiority of American-made dyestuffs compared with those that previously had been imported from abroad. Many a department store and shop customer, when inquiring about the fastness of wash materials, has been told that the colors that have been used are the best obtainable, but that the store could not "guarantee" their fastness because American-made and not German dyestuffs had been used. Such an assertion is obviously unfair to American dyestuff manufacturers, and in addition is decidedly untrue.

The myth concerning the inferiority of American-made dyestuffs arose primarily because of incidents that were experienced during the late World War. Considering the tremendous demands that fell upon the shoulders of our infant dyestuff industry during those hectic days of 1914 and thereafter, it is no wonder that color difficulties were experienced. With the blockade of the German coast by the British fleet, the textile, paint, leather, ink and paper industries of the United States were cut off from practically 90 per cent of their dyestuff supply. In 1914, for instance, there were only seven small dyestuff manufacturers in the

United States; they were meeting approximately 10 per cent of the country's color needs, and no more. In spite of this tremendous shortage of dyestuffs, color demand continued the same as ever. In order to meet this demand, many of the simpler organic dyestuffs were produced regardless of their fastness to light and washing.

The hue and cry of the day was for colors, not fastness, and this demand had to be met. It is even recorded that colors that originally had been designed for use in the paper industry were used to dye cotton and silk. Old German dyestuffs that had been abandoned years before in favor of newer and faster colors were taken from storehouses and used. As a matter of fact, some of the very colors that the American public was condemning in those days as being cheap, inferior, American-made products actually had been manufactured in Germany during the pre-war days. In a further attempt to meet the crying need for colors, the use of such vegetable dyes as fustic, quebracho and even Osage Orange was revived. Logwood again gained a firm foothold, and printers and dyers sometimes had to revert to methods that had not been used for years.

The conditions of 1914-17, however, hardly apply to 1929. As organic crudes and intermediates have become more abundant, newer and faster colors have been produced, until for the last few years the United States has been over 90 per cent self-supporting so far as colors are concerned, and still has a surplus available for export purposes. Type for type and dye for dye, the American-made product is just as good as dyestuffs that previously had been imported.

It is well for everyone to remember that an organic dyestuff is a specific type of chemical. If two dyestuffs are made in the same way from the same raw materials and by the same methods, the resulting products will be identical in dyeing properties and in fastness. If Indanthrene Golden Orange is made by the same methods, its properties will be the same whether American, German or Japanese chemists have been in charge of the work. The United States, it should be realized, produces fast colors and quantities of them. It also produces colors of so-called moderate and poor fastness, and so does Germany, England and Switzerland, for that matter.

After all, fastness depends on the colors that are chosen for use by the dyer and printer. This choice, incidentally, is somewhat dependent upon the price that is being paid for coloring and finishing. The manufacturer of dyestuffs has little to do with the choice of colors. If a given product is not manufactured in the United States, it can be imported. All that the dyestuff maker can do is to continue to turn out colors for which there is a demand and at the same time foster the use of better colors as they are produced. The present era of misrepresentation of fugitive colors as fast cannot be laid at the door of the American dyestuff manufacturer, any more than it can be placed upon the shoulders of laundry owners and dry-cleaners. The fastness of colors is governed largely by the properties of the dyestuffs that are used and the method of application.

FORTY INDUSTRIES WILL DISPLAY AT CHEMICAL EXPOSITION

Show Opening in New York May 6 Will Present Panorama of American Achievement

A FIELD wider and invested capital greater than that of any other group of industries in the world is represented by the chemical industry and its associated interests, we are reminded in an announcement of the forthcoming Twelfth Exposition of Chemical Industries, which will be held at the Grand Central Palace, New York, during the week of May 6.

Occupying three floors of this mammoth exhibition palace, the Chemical Exposition will comprise more than four hundred separate exhibits, and the material and equipment displayed will be furnished by over forty industries.

Modern chemical engineering practice reaches into every field and the practices of chemistry have, through constant research, brought American industry to the point where it leads the world in total output and capital invested. A rayon plant, for example, requires a minimum investment of $3,500,000; the chemist and chemical engineer have raised rayon to its high standard of production in American industry, yet the investment of capital is small compared to the entire chemical industries.

Since the exposition held in the fall of 1927, many new processes have been developed, and plant equipment now comprises many new machines and devices employed in the chemical consuming industries. The most scientific methods of applying research to industry under the supervision of experienced technicians representing chemical equipment manufacturers will be exhibited at the Chemical Exposition.

An added exhibit to the number of United States Government displays, which were such an important feature of previous shows, will be the exhibit of the Chemical Warfare Service, details of which will be published later.

As usual, a number of the largest and most active chemical societies will hold special meetings during the week of the show, and the regular program of Students' Courses in chemical engineering will be offered daily, as in previous years.

Col. Harry L. Gilchrist has attained the rank of Major General and has been appointed to head the Chemical Warfare Service of the United States Army, succeeding Major General Amos A. Fries. He has been chief of the Medical Division of the Chemical Warfare Service.

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April 15, 1929

"A MACHINERY SHOW"

THE Twenty-fifth Annual Knitting Arts Exhibition which opens its doors in Philadelphia this week may be regarded as a splendid pageant of the mechanization of the textile industry. The exhibition has recorded every change in knitting manufacture for a quarter of a century. Comprising but one branch of the textile industry, nevertheless it is a branch that in recent years has grown amazingly in importance, the offspring of modern style.

In its essentials knit goods manufacturing is obviously not different from any other branch of the industry; from a production standpoint its operations are directed toward an end identical with that of the woven fabrics branch: the transformation of a raw material into merchandise salable chiefly to the public. Its processes may differ in kind—but they are practically all mechanical. If there exists an industry more completely mechanized than the knitting industry we have never heard of it.

In spite of this condition, a condition that has formed the very base of the whole textile industry's advancement during the past quarter century, you will frequently hear the criticism, "These textile shows are becoming nothing but machinery shows."

If the machinery on which depends the mass production of the most highly developed products of textile manufacturing is not to be displayed, as these critics seem to imply, then what can be displayed that will convey a more realistic picture of our industry's essential character? Any textile exhibit is far more than a mere "machinery show" to the thinking individual who fully realizes the revolutionary effect which a constantly *improved* machinery is exerting on the course of the textile industry in every country in the world.

In the wet-processing departments of the modern textile plant, mechanical improvement must never lag behind advances in the chemistry of processing. Recent improvements in dyeing and finishing machinery, some of which are displayed this week at Philadelphia, demonstrate that, although dyeing is one of the oldest arts in the world, the ultimate in efficient production will probably never be reached. There is a constant forward striving which better machinery tangibly displays.

DRAGONS, FAST DYES, AND "ECONOMY"

ONE of the heroes of mythology made his name immortal by slaying a seven-headed dragon. Not an ordinary reptile was this, however; for, according to the story, no sooner had the hero sliced off one of the monster's heads than two more grew in its place.

A dragon no easier to vanquish was born when the first accusation was made, about ten years ago, that all American dyes were inferior to imported dyes. That accusation was undoubtedly true at the time it was first made, when the domestic dyestuff industry had been on the map only a few months and was toiling bravely to supply the frantic demand for dyes. "Any kind will do!" the mills insisted. (And the unborn dragon stirred and laughed.) Later, sox and dress goods faded at one touch of sun, and pretty colors stained the suds in mother's washtub. "And all because"—retail store clerks solemnly told shoppers, and people repeated to each other—"because *American* dyes are being used." (And lo, the dreadful dragon was born!)

Since that unlucky day our dye industry and its staunch supporters have been kept busy lopping off this dragon's heads whenever they appeared on the horizon; but the dragon, a tough old bird, the son of Ignorance and second cousin to a Lie, has lived on, somewhat scarred but apparently unharmed.

Only a few weeks ago a prominent dress manufacturer arose to slander American fast dyes, declaring that "before the war, when German dyes were used it was never necessary to question the character of a color, even on cheap percale"; and that, "If American dyes will not fill domestic requirements for cotton wash fabrics, then means for bringing in German dyes at fair prices should be the extreme measure."

His statements were quoted in the Daily News Record and drew justly indignant retorts from men high in our textile and dyestuff industries. The original accusation and some of the caustic comments thereon are reprinted elsewhere in this issue.

That those who rallied to support the reputation of American dyes were not all dye manufacturers is a very gratifying fact. Henry B. Thompson, president of the United States Finishing Company, and G. T. Metcalf, of the Franklin Process Company, both swung vigorously at the dragon's latest head. George H Johnson, of the Laundryowners' National Association, also landed a few well-aimed slices; and Dr. E. H

Killheffer, president of the Newport Chemical Works, Inc., who characterized the dress manufacturer's assertions as "a grossly unfair indictment of an industry," quickly disposed of the remains in a few pointed paragraphs.

This latest dragon was easily carved up because, like many of his forbears, he was so amusingly illogical. He virtually chewed off his own head by the reference to conditions "before the war"—as he believed they were. Either that dress manufacturer is too young to remember, and was therefore misinformed, or he was simply saying nasty things to be downright cussed and malicious. Otherwise he might have recalled that before the war there were very few fast colors used on cotton frocks, and almost no "fast-color consciousness" existed. As G. T. Metcalf reminds us, in that pre-war era only yarn-dyed shirtings were fast, in our modern meaning of the term; the use of fast dyestuffs on piece goods or in prints was negligible. In fact, the public of that easygoing age seldom bothered to ask about fastness—assuming that the dyes in all the merchandise they bought were the best available for the purpose.

To-day we have a "fast-color consciousness" that is very much alive. Also, fortunately, we have fast colors. It is true, of course—and we should not hesitate to admit it—that the term "fast" is often mistakenly used and that guarantees are sometimes more poetry than truth. But we have fast dyes, made in America by American producers, and the women shoppers know it. Thousands of them may still believe that a dye *must* come from Germany to be fast, but millions have learned that the best American dyes are as fast as any colors ever imported in "the good old days," and some are faster. And a majority of those who have learned this have also learned to ask for fast-dyed goods and to expect certain kinds of garments to stand ordinary laundering and light exposure even though these garments have been dyed with *American* colors. Later we shall have standardized fastness, and then everybody—mills, shoppers, laundries, retail stores—should know that fast dyes are available, and that the American range of shades, while not complete, grows steadily.

But what relation has fastness to the price of the goods? A more direct relation than it should have. Far too many near-sighted textile buyers are ordering goods chiefly on the basis of price, to meet competition and to add a few pennies to their net profits. The satisfaction and good-will of their customers evidently do not enter into their calculations. But what can be done about it? Educate the buyers? That would help; for if the women *are* willing to pay more for fast goods, and if dress manufacturers *can* have their goods dyed or printed as fast as they are willing to pay for, what argument remains for the dress buyer? He has not a wooden leg to stand on. Is it not time, therefore, to wake up the buyers who purchase goods on price when goods should be ordered to satisfy the public demand for fastness—especially since that public will pay the difference in price, if it is a reasonable difference and not a dollar added for every fifteen cents' worth of vat dye?

On the other hand, we should be cautious and not go too far in the effort to persuade these misinformed garment makers and buyers that fast dyes made in America are available. Irritated by their prejudice for imported dyes, we hasten to tell them that they can get domestic fast colors by the ton *if they will pay the price*. That argument, however, to many people may seem to imply that fastness is costly. Actually we know that the best fastness costs very little, per garment or per yard, because the cost of the dye in any fabric is too insignificant to cut any sizable hole in a mill's net profits. The cost of applying the fastest types of colors is in many cases higher than for ordinary dyes, but even that extra cost cuts a small figure beside the price per yard of fast-dyed fabrics.

Greater emphasis should be put on the economy of buying the best dyes for most purposes, therefore, regardless of price, because in the final reckoning dyes are a pretty small item in any mill's operating expenses. We should take care not to imply that fast dyes are so much more expensive than the fugitive kinds. The prices of American vat colors have been dropping steadily year after year, and are likely to go still lower. They will strike bottom when dress buyers learn to demand faster goods from those mills that are now trying to save money on dyes.

George H. Johnson sums up the strongest argument when he says: "After all, fastness depends on the colors that are *chosen* for use by the dyer and printer." When that has been said, everything has been said.

GUARANTEES, AND HOW THEY AFFECT THE CONSUMER

"Warranted fast colors," says one manufacturer; "fast-dyed," says another; "fast to sunlight, perspiration and laundering," is the way it is put by a third; "guaranteed color fast," by still another, and so on.

Exactly what does your guarantee mean—in other words, what will you do about it in case your product *does* fade? "We will replace any garment made of genuine 'Peter Pan' if it fades," says Henry Glass & Co., in their advertisements. That's definite and to the point as to what the consumer may expect—removes all doubt—indicates that there will be no "passing of the buck" as to where the fault lies.

But more than that, it strikes us that a guarantee worded as clearly and definitely as this one serves as an enticing selling argument for the sale of the goods in the first place, for the would-be purchaser is likely to reason: "The goods must be right or the manufacturer wouldn't dare offer such a guarantee."

Referring to guarantees in general, reminds us of a

story we heard not long ago about a man who was looking over some overcoats in a store in a certain Jersey city. Said the merchant in his anxiety to make a sale: "This coat you have on is certainly classy, and I'll guarantee that it lasts you at least five years." "But suppose that it doesn't, then what?" remarked the customer. The merchant was nonplussed, but finally stammered: "If it doesn't, I'll sell you another one."

Maybe some guarantees are intended to be like that.—*The Laundry Standard.*

EXTRACTORIALS

Get a picture of your job in relation to the whole business with which you are connected and then in turn see how this whole business relates itself to society at large, and you will see that nothing which contributes to the success of a worth-while business is mean or trivial. A rivet which holds a belt together is relatively as important as the flywheel of the motor.—*Harris-Dibble Bulletin.*

The political problems of the day are best approached by the scientific method, and if those in public office cannot be men with technical training they should at least seek the advice of the technical man, who should be prepared to assist all our public servants. . . . Today, to an extent never before approached, even international relations can be profoundly disturbed by scientific discoveries; conflicts once initiated because of natural resources may be eliminated forever, thanks to processes devised in the laboratory.—*Industrial and Engineering Chemistry.*

When the country finds that a great basic industry, vital to all the rest, is desperately sick, it cannot remain unconcerned. The social and economic welfare of millions of its citizens is involved.—*George J. Anderson, in Atlantic Monthly.*

The management may have a broad, generous attitude toward its employees and a liberal policy toward its customers, but all of this can be nullified absolutely by the stubbornness of a narrow-minded foreman who is lacking in the vision that is necessary in an executive.—*Herbert Flowers, in Executives Service Bulletin.*

Many mill executives are now encouraging the high school graduates in their respective communities to take textile training.—*H. H. Willis, director, textile department of Clemson College.* It is gratifying to learn that mill executives are appreciating the industry's great need for scientifically trained youth.—*Advertisement of the Woolen Corporation of America.*

STRESSES THE IMPORTANCE OF SILK-WEIGHTING CONTROL

President of Silk Association, in Annual Address, Warns of Abuses

"EVERYONE whose business prosperity depends on the consumption of silk by the public should take into consideration the importance of supporting the association's program of weighting control," said H. Schniewind, Jr., president of the Silk Association of America, at its fifty-seventh annual meeting, held in New York, March 27.

In the course of his annual address Mr. Schniewind explained the problems of weighting control in relation to consumer demand. "I want to speak to you for a few minutes about a subject which interests each division of the industry," he said, "namely, consumer demand, by which I mean when, what and how much the public wants."

"Perhaps one of the most important concessions to consumer interest at the present time is the control of weighting," he continued. "This past year, especially since January, much time and money has been spent to educate the trade on the dangers of excessive and improper weighting. Like all good things, weighting has to a certain extent become abused. Much has been said for and against weighting. We have the proponents of the theory that weighting of all kind should be eliminated. Others contend that weighting is nobody's business; that as long as the public will buy weighted goods they should be produced. Nothing so radical as either school of thought will probably satisfy the trade or consumer. The public likes the fabric of heavy draping quality. On the other hand, they do not like the garment or fabric which breaks away easily at the seams or which shrinks excessively in cleaning or laundering. We must, then, work together to distribute only such fabrics that are so weighted that they will give satisfaction to the purchaser, and by 'so weighted' I mean not only the amount of weighting but the method of weighting and the construction of the cloth as well. Weighting as a finish to bring out the beauty and salability of silk is satisfactory.

"Excessive weighting as an adulterant of silks is a menace to the welfare of the silk industry. And this question concerns not only those most directly interested, the manufacturer or converter, and the dyer. The raw silk man and throwster, the factor, the jobber and selling agent—everyone whose business prosperity depends on the consumption of silk by the public—should take into consideration the importance of supporting the association's program of weighting control. The use of weighting has increased the consumption of raw silk, as it has opened up new channels of sales in the more popular price fields of merchandise. Actual sales have increased, with resulting profit to factor and selling agent."

INQUIRY DEPARTMENT

All classes of chemical work or advice relating to artificial colors, natural dyestuffs, dyewoods, raw materials, extracts, intermediates, crudes, or dyeing chemicals and accessories in general, will be carried out for readers and subscribers of the AMERICAN DYESTUFF REPORTER by this department.

Inquiries of a minor character will be answered on this page, while major matters involving personal investigation, analyses, perfected processes and working formulas, will, if desired, be treated confidentially through the mails. In answering inquiries which, by their nature, require reference to the products, processes or apparatus of some particular manufacturer we aim to be absolutely impartial. We refer the inquiries to specialists whom we believe to be best qualified to answer them intelligently, and must disclaim responsibility if their reports show unintentional bias. All questions, materials for analysis or letters leading to the opening of negotiations for special work will receive prompt attention if addressed to Inquiry Department, American Dyestuff Reporter, 90 William Street, New York City.

S. M. C.—Question: In stripping navy blue clips which are to be manufactured into shoddy we are experiencing great difficulties, inasmuch as, although when the goods are under the stripping agent they appear perfectly white, upon running off the liquor the goods, while not going back to their original depth of shade, do oxidize a light blue. We should be pleased if you could inform us of anything which we can add to the stripping bath to stop this reaction or of any aftertreatment to which we could subject the goods. We are informed that in England they are using a titanium salt with great success. Could you inform us what this would be?

Answer: We are of the impression that you have probably encountered navy blue clips which are dyed with chrome colors and which are regarded in the trade as being in most instances unstripable, and we doubt that you can successfully clear them to a pure white. We understand that clips of this character are regularly sold to shoddy manufacturers in different shades of blue.

The titanium salt of which you spoke is probably a mixture of titanium chloride and tartaric acid. A preparation of this type called "STS Solution" is sold for stripping purposes by the Lindsay Light Company, Chicago, Ill. It is possible that if you will communicate with them you may be able to obtain some help in your problem.

S. W. M.—Question: We are enclosing a small sample of wool, our local wool scoured.

We wish you would give us a formula for carbonizing this wool in the open tub and at the same time giving it a little bleach.

If you can give us the information as to how to do this, we will appreciate it very much. We believe that it can be done and that you can furnish us the information.

Answer: It would be impossible to carry out the carbonizing process in the open tub. The best method for carbonizing would consist in saturating this wool with a 5 to 6% sulphuric acid solution, then thoroughly hydro-extract it and dry in two stages: the first stage around 212° F. and the second stage at at least 230 to 235° F. It should then be worked in a duster and neutralized with a mild alkali like ammonia.

As far as bleaching is concerned, the wool could be bleached in an open tub, either by the use of peroxide or a sulphurous acid bath. In the former case you would probably use sodium peroxide in the usual way, which consists in adding the proper amount of peroxide to a bath containing dilute sulphuric acid and then proceed with the bleaching at a temperature not above 120 to 140° F. In case sulphurous acid was used, the proper amount of bisulphite of soda would be added to the bleaching bath along with a sufficient amount of dilute sulphuric acid to liberate the sulphurous acid. This latter process of course should be carried out where there is good ventilation to remove the sulphur dioxide vapors they may escape. Ventilation with the peroxide process would not be as essential. The amount of chemical used would depend altogether upon the size of the vat, quantity of wool to be treated, etc.

H. N. B.—Question: Do you know a good process which will bleach yellow feathers pure white?

Answer: In bleaching feathers, the best results are obtained by using a peroxide of hydrogen bleach and the method is as follows: After thoroughly washing in soap and a little ammonia or some other mild alkali to remove all traces of adhering dirt and natural greases, the feathers are bleached in a five volume peroxide of hydrogen bath (temperature raised to 110° F.) to which just enough ammonia is added to make slightly alkaline, which can be determined with litmus paper. The time required for bleaching is about 15 hours, or overnight. Occasionally, however, a second bleach is required and is given in the same bath, which is replenished with a small amount of peroxide and ammonia and carried on for a few hours longer. The goods are then thoroughly rinsed, blued in a weak bath of Soluble Blue or Methyl Violet and then immersed in a bath of starch and beaten while drying to open the flue.

LOGWOOD IMPORTS

A report recently received from Consul Jose de Olivares, Kingston, states that exports of logwood extract to the United States from Jamaica during the calendar year 1928 amounted to 104,819 pounds, valued at $17,236, as compared with 111,262 pounds, declared at $18,557, exported in 1927, resulting in a decrease in quantity of 6,443 pounds, and in declared value of $1,321.

Technical Notes from Foreign Sources

Pattern Effects on Woven Goods

Austrian Patent No. 108,121; *Aktien-Ges. Cilander.*—Mixed weaves of animal and vegetable fibers may be printed locally with such alkalies as destroy only the animal constituents of the weave, and do not harm the vegetable portions. For example, one may print with an alkaline paste thickened with gums, steam, and wash. Further, such a weave may be printed with a reserve paste which will protect the animal constituent of the part so printed against the destructive influence of the alkali, and then exposed to the action of alkali until all of the unprotected animal constituent is destroyed.

Formation of Alizarine Lakes

S. Liepatoff, Mell. Textil-Ber., 496, 9 (1928).—A theoretical discussion from a purely theoretical standpoint. The author discusses the meaning of the results of some of his work on nitro-alizarine.

Production of Patterns on Cotton Goods

English Patent No. 268,389; *Heberlein & Co. A. G.*—Cotton goods are locally hot-pressed, for example, by dry printing with a print-roll heated to 140° C. It is claimed that the parts so pressed and heated are so altered that they are affected little or not at all by subsequent treatment with swelling agents. After treatment with the latter, which may consist of mercerizing liquor, sulphuric acid of 42° B., phosphoric acid of over 50° B., hydrochloric acid of 20° B., nitric acid of 35° B., or mixtures of these acids or solutions of zinc chloride, calcium sulphocyanide, or copper-oxide-ammonia liquor, the fabric is simply washed.

Printing of Mixed Weaves Containing Cellulose Acetate

English Patent No. 270,657 (*addition to English Patent No.* 256,238); *Etablissements Petitdidier.*—Goods of acetate rayon on a ground of natural silk or wool may be printed with dyestuffs suitable for acetate rayon, and the ground fabric then decolorized with a bath of potassium permanganate, followed by a bath of sodium bisulphite.

Alteration of Dyeing Properties of Cotton or Viscose Rayon

English Patent No. 283,672; *Courtauld's, Ltd., H. J. Hegan and J. H. Taylor.*—The material is treated with a solution of tannin and zinc chloride, then with a soap solution or a weak alkaline solution, as of sodium carbonate. Goods thus treated possess little or no affinity for most substantive dyestuffs.

Weighting of Rayons

English Patent No. 280,094; *Rene Clavel.*—The goods are treated with successive weighting baths, without washing or neutralization taking place between them. Addition of acids or of protective colloids prevents precipitation upon the surface of the fiber. For example, a weave of cellulose acetate is led through a bath of 1% aqueous phosphoric acid solution containing 12 g. of glue to the liter, then through a solution of stannic chloride of 35° B., then squeezed, and passed into a 10% solution of mono-sodium phosphate, then into a bath of 6% solution of mono-sodium phosphate, then into a bath of 6% solution of disodium phosphate. After squeezing the goods are further treated with a sodium silicate solution of 1° B., containing also 1 g. of soap per liter. The goods may be still further treated with a solution of ammonium carbonate.

Weighting of Natural Silk

English Patent No. 283,019; (*addition to English Patent No.* 266,640); *Rene Clavel.*—Before the silk is entered into the bath of metallic salt used, it is treated with a solution of acids or acid salts, if necessary with the further addition of protective colloids. If the latter are used, the addition of acids to the bath of metallic salts may be diminished or omitted entirely. Silk goods are, for example, passed in succession through a 1% phosphoric acid bath containing 12 g. of glue per liter, then through four stannic chloride baths of 35° B., then through squeeze rolls into a 10% bath of mono-sodium phosphate, then a 6% bath of disodium phosphate. Final treatment is a passage through a sodium silicate solution of 1° B., containing 1 g. of soap per liter. (Compare the previous abstract.)

Device for Examination of Rayon in Microscopic Dark Field

Dr. Alois Herzog; Kunstseide 281, 10 (1928).—Investigation of fibers under the ultra-microscope or in the microscopic dark field has not been a very attractive mode of study. In most cases a very expensive apparatus, hardly available in most laboratories, has been thought requisite, which is not the case. The Siedentopf paraboloid condenser, which fits into the socket of the Abbe condenser, gives satisfactory results if a powerful source of light be used. The fibers are, as a rule, prepared in water and covered on the slide with a cover-glass, which is then best ringed with a suitable cement to prevent evaporation of the water during study of the preparation. The underside of the slide,

which must be of the thickness assumed in the calculation of the curves of the paraboloid condenser, is then optically united with the uppermost lens surface of the condenser by a drop of cedar oil. One has only to take care that the slide, etc., carries no dirty streaks, scratches or other defects, as these occasion much difficulty in obtaining a clear image, or even prevent this entirely. Even with dry objectives of medium focus (e. g., a Zeiss Apochromat f = 4 mm.) or immersion objectives (e. g., a Zeiss Immersionapochromat 1/12" with conical immersed diaphragm), valuable results can be obtained with simple precautions such as just mentioned—results often of great practical value. Thus, a rapid differentiation between viscose and cupromonium rayon is possible, the chemical methods at present necessary for this distinction requiring much experience and roundabout manipulation.

"As is known, the ordinary microscopical investigation of these rayons (viscose and cupro) gives absolutely decisive results neither in the sectional nor longitudinal aspect. One can hardly blame too severely the statements of several authors, who, in spite of the literature dealing with this case, persist in citing the cross-sectional characteristics of these two fibers as principal criteria: they apparently do not know that, according to the coagulating bath chosen, viscose rayon may display a circular cross-section which absolutely duplicates that of cupro. The results of (ordinary) microscopic study can be of value in such cases only when strikingly irregular sections are predominant in the series under examination; in this case only is one justified in deciding for viscose, presupposing that earlier tests have shown the absence of nitro-cellulose and acetate rayons. In all other cases—i. e., with circular (we use the word in the sense of generally or roughly circular)—sections a decisive conclusion is not possible. Then, too, the dyeing reactions proposed are dependent upon so many collateral circumstances that much judgment has to be exercised as to one's conclusions. It ought to be specially mentioned that very great differences in dye affinity exist between the older coarse cupro fiber and the fine grade now so popular."

Construction of the Instrument

The optical firm of E. Leitz, Wetzlar, Germany, has recently brought out an apparatus which is illustrated and described by the author. He recommends it warmly. It may be described as follows: A small arc lamp of the type commonly used in microscopic work is used as the source of light. "Upon a vertical rod rising from a heavy base is fixed a round metal plate, adjustable for height (the plate is in the vertical plane). In the middle of this plate, over a perforation of suitable diameter, is fixed a plano-convex lens, and in connection with this an iris diaphragm, which serves to control the pencil of light passing from the arc through the lens. Upon the other side of the plate (the one facing the arc lamp; the lens and iris diaphragm face toward the microscope) are attached two mirrors, mounted one above and one below the lens orifice and adjustable for angle in two planes. (According to the illustration, the ray of light from the arc lamp passes at a somewhat downward angle, through what is presumably an alum bath heat filter, to the lower mirror, and from there is reflected upward to the upper mirror, which throw it into the lens and diaphragm, which it leaves as a horizontal beam.) To the other side of the vertical plate, and fitting against the housing of the lens and diaphragm, is attached a metal tube about 10 cm. long, pointing in the axis of the apparatus and carrying at the farther end (next to the microscope) a microscopic objective—e. g., a No. 3 of Leitz—pointing forward toward the microscope. The light from the arc is thus collected, brought into suitable convergence, and thrown into the microscopic field.

The preparation of the slide is carried out thus: Upon the upper side of a small block, such as is used in the preparation of paraffine blocks for section work, a small glass plate, best of black glass ground finely matt, is cemented with Canada balsam; upon this is spread the material to be examined, as uniformly as possible, but not in too thick a layer, and the preparation covered with a cover glass. Either air or water mounting may be employed. The block, with plate and fiber, etc., is placed directly upon the microscope stage, or, better, is mounted upon a microscope slide with Canada balsam, for convenience in moving it about. The preparation is then illuminated laterally with the already described lighting arrangement. For air-mounted preparations, the cover glass serves principally as a weight to hold the prepared material down flat and to prevent its disturbance by air currents; and the alteration of shape and position of the material, through the variation of the water content of the air, is also essentially prevented.

If more powerful objectives are used, the employment of a cover glass is necessary, since otherwise merely ill-defined and valueless images are obtained, unless one employs special objectives calculated for use without cover glasses. In any case, special care must be given to the correct adjustment of the illumination apparatus and the arc lamp. The most favorable illumination is obtained empirically by raising or lowering the vertical plate and by adjustment of mirrors and diaphragm. The brightness of the microscopical image is perfectly satisfactory for analytical purposes. As a rule, a medium-powered dry achromat (e. g., Zeiss C), in combination with a strong ocular, is satisfactory. This objective gives very clear images even with uncovered preparations. To avoid disturbing reflections, which are especially troublesome with rayons, because they mostly "blind" (*ueberstrahlen*) the extraordinarily fine ultra-structure of the

interior of the fiber, it is best to examine the fiber in a diagonal position; that is, so to orientate it, that its longitudinal axis passes through quadrants I and III, or II and IV. A microscope with rotating and centering stage is, of course, most convenient for such adjustment of the fiber.

Differences in Luminescence of Fibers

"In particular, it may be noted briefly, in case of examination of the ultra-microscopic structure of viscose and cupro rayons, the ultra-structure of the fine-fibered cupro rayon corresponds in all points with that of the formerly manufactured coarse-fibered product. Differences in luminescence between the two grades are noticeable, of course, the finer being less luminescent.

"Through rotation of the fiber in the plane of the stage it is nearly always possible to find a position in which the very bright diffraction planes on the edges cause the least visual disturbance, so that the actual structure comes out plainly. Even with low magnifications, it is evident that the structure appears milky-turbid, but only stronger magnification displays the true ultra-structure. The clearest images are obtained by using the Zeiss Immersionapochromat 2, concurrently with strong compensation eyepieces; for technical analytical purposes, however, the previously mentioned simpler objectives are sufficient. Apart from impurities here and there which, with this method of illumination, show up very strongly luminescent, and therefore cannot be confused with the actual ultra-structure, the bulk of the fiber is extraordinarily pure and luminescent. Viscose rayon, fine or coarse fibered, is nearly optically void; that is, it is only seldom possible to find indications of the previously mentioned internal structure. Under all circumstances such an indication is essentially less luminescent than in the case of cupro rayon. One may further add that the general mass of viscose rayon contains a surprising amount of granular and finely splintered particles, so to speak, which under ultra-microscopic examination show up strongly luminescent. It is important to note this circumstance, since otherwise, with insufficient experience, confusion of the luminescent impurities with the true ultra-structure might arise."

In closing, the author points out the advantages of the simplified apparatus over the more elaborate and cumbersome forms usually understood to be necessary in ultra-microscopic work, with the obvious warning that it cannot be used for searching and refined investigations of structure from the abstract viewpoint, but that for rapid analytical purposes it is of very great convenience and value.

Production of Very Fine Viscose Fibers

D. R.-P., No. 458,790; *Verein. Glanzstoff. Fabr. A.-G. in Elberfeld.*—Reference is made to D.R.-P. No. 444,113 for a process of spinning viscose of from 6—1 deniers and finer by the use of baths containing salts and sulphuric acid. The present process employs an acid which contains organic constituents, such as are formed by hydrolysis of cellulose substances, as cellular material, cotton waste, cellulose hydrate, waste viscose, etc., with sulphuric acid. Since fresh sulphuric acid must be continuously added to the spinning bath, pure acid is not used, but the crude product obtained as above, after filtration if necessary.

The concentration of titratable sulphuric acid in the bath must be adjusted, under carefully worked-out conditions for a given titer, to at least the same minimum as given in the earlier patent referred to above.

For example, in a bath at about 40° C., containing 250 g. of sulphuric acid and only about 280 g. sodium sulphate per liter, raw viscose of 9° ripeness (ammonium chloride method) is spun through a spinneret of 0.1 mm. diameter at a rate of 45 meters per minute. Fiber of only weak luster is produced. If the bath contains a part of the sulphuric acid as "cellulose-sulphuric acid," corresponding to 80 g. dry weight of cellulose, a very lustrous, very elastic fiber is formed.

The greater the acid concentration of the bath the lower the salt content, and the younger the viscose the more is the percentage of hydrolysis products to be increased.

Dyeing of Acetate Rayon

D.R.-P. No. 459,823 (*addition to D.R.-P. No.* 446,-541); *I. G. Farbenindustrie A.-G.*—The material is worked appropriately in a bath containing a diazotizable amine, a suitable second component, nitrite, and soap, Turkey Red Oil, etc., preferably in a hot solution or suspension, and in the same bath the azo dyestuff is produced in the fiber by addition of acids or acid substances.

For example, 20 g. of acetate rayon is treated for thirty minutes at 60 to 70° C. in a bath of 500 c.c. containing per liter 0.4 g. of amino-azo-benzene, 5 c.c. of a 1-10 beta-naphthol-caustic solution, 50 c.c. Monopole soap solution of 1-20, and 50 c.c. of a 1-10 solution of sodium nitrite. Twenty-five cubic centimeters of acetic acid of 6° Be. is then added, and the acetate silk worked at the same temperature for twenty to thirty minutes. A bright red dyeing is obtained. Or 0.3 g. of dichlorbenzidine may be substituted for the amino-azo-benzene and 10 c.c. of 50% Turkey Red oil for the Monopole soap solution; in this case a bright orange is obtained.

Azo Dyestuff for Acetate Rayon

D.R.-P. No. 461,647; *I. G. Farbenindustrie A.-G.*—By coupling diazotized p-nitroaniline to 4-nitro-1-3-phenylene-diamine, dissolved in hot water and poured upon ice. After stirring for several hours, the dyestuff is filtered off and dried. It forms an orange powder

which dyes acetate rayon orange in excellent fashion. It is surprising that the corresponding dyestuff from m-nitro-aniline is a very poor dyestuff.

Spinning of Viscose Rayon

D.R.-P. No. 460,257; *Firma Fr. Kuettner u. Willy Linke in Pirna.*—A precipitating bath consisting of sodium bisulphite solution is especially effective if magnesium sulphate is added to it. The advantage lies in the fact that a fiber is formed which possesses a very high tenacity and elasticity. The viscose solution must not be too young.

A typical bath consists of 15 liters of sodium bisulphite solution of a specific gravity of 0.33, in which has been dissolved 7 kilos of crystallized magnesium sulphate. The specific gravity of the solution is 1.380. The best spinning temperature lies between 40 and 50° C.

Measurement of Color Intensity on Lustrous Goods

Dr. A. Klughardt; Seide 333, 33 (1928).—A discussion covering eight quarto pages, with eight diagrams and four tables. It does not lend itself to abbreviation, owing to its nature.

Dr. W. Weltzien; Seide 346, 33 (1928).—A continuation, but in appearance, at least, independent of an article appearing in 1926 (Seide 175, 31, and Mitt. d. Textil. Forsch.—Anst. II, 29). The present treatment takes up the microscopic (binocular), photomicroscopic and stereoscopic examination of weaves. More details are promised for later communication.

DESIGN REGISTRATION NOW TAKES IN RAYON, COTTON

Original designs for use on rayon and cotton fabrics are now registered by the Design Registration Bureau of the Silk Association of America, Inc. Formerly only designs intended for use on costume silks were registered.

The Design Bureau extends its registration service at the request of cotton and rayon manufacturers who have for some time felt the need for design registration in their particular industry and who have asked that the Bureau act as a general clearing house for original designs for cotton and rayon as well as for silk.

An original drawing must be sent to the Design Bureau accompanied by an application form covering either Jacquard or printed fabrics, which is furnished by the Design Bureau, and a check to cover cost of registration. After the design is passed upon a photostat copy together with the original drawing and a certificate of registration will be sent the owner. If the design is not registerable both design and check will be returned to the owner, a small charge being made for searching the file.

COLOR RADIATION OF ORGANIC COMPOUNDS STUDIED

May Have Direct Bearing Upon Study of Matter

An investigation on the scattering of color by complicated organic compounds is being conducted by the Bureau of Standards at Washington in co-operation with the National Research Council. Dr. R. M. Langer, of the Council, is at work on this study in the laboratory of the Optics Division of the Bureau under the direction of the chief of the division, Dr. C. A. Skinner.

An announcement on the research was recently released by the Department of Commerce as follows:

"When a substance composed of molecules having many atoms—the organic compounds, for example—is illuminated by light of a single color, the substance scatters not only the incident color but also other colors which are characteristic of the scattering substance as well as of the incident light.

"This phenomenon, at first mysterious, seems to be a consequence of the present theories of physics. It promises to be a powerful tool for the investigation of the infra-red spectra of complicated molecules. The change in color observed is intimately connected with the long wave length radiation in the infra-red which the substance is capable of absorbing or giving out.

"This infra-red radiation has long been known, but is still little understood. It is due to the vibrations of the atoms in the molecule with respect to one another and to their rotations about one another. Solid substances also have infra-red radiations, which are sometimes due to the vibrations of the molecules about their fixed positions in the crystal lattice of which the solid is composed. These vibrations give evidence of the forces between atoms and of the energy with which chemical compounds are bound. The scattering experiments will therefore be of importance to chemistry."

WOOL COLOR DESCRIBED IN NEW LEAFLET

Supranol Orange RR, a dyestuff manufactured by the I. G. Farbenindustrie and distributed in this country by General Dyestuff Corporation, is described in a folder recently issued by the latter company. This leaflet contains swatches of the shade on woolen and on silk piece goods and woolen yarn. The color is not only useful as a self-shade, according to the description, but levels well and is suitable for producing compound shades with similar dyestuffs. As a new acid wool dye it is of clear, bright shade, it is claimed, fast to water and of very good fastness to milling.

Another leaflet recently issued by General Dyestuff Corporation displays a swatch dyed with Katigen Brilliant Corinth 3G, a new sulphur color manufactured by Grasselli Dyestuff Corporation, now known as General Aniline Works. According to the announcement this new type represents a sulphur dye of very satisfactory fastness to light, washing and cross-dyeing and produces a rather unique shade of terra cotta. It may be used for dyeing all kinds of cotton material.

TESTING METHODS, STANDARDS AND TYPES FOR DETERMINING THE FASTNESS OF DYED RAYONS

(*Continued from page 240*)

III. Depth and tone hardly altered; white material slightly colored.	III. One per cent Cellitazol SR, developed with 1.5% of resorcinol. One part of Cellitazol SR is brought into solution with 50 parts of boiling water and 2 parts of hydrochloric acid of 20° B. After about ¼ hour's dyeing, 10% of sodium acetate is added, the dyeing completed in ½ hour, the material rinsed, diazotized with 4% sodium nitrite and 10% hydrochloric acid of 20° B. for 20 minutes in the cold, quickly rinsed, and developed for ½ hour with 1.5 g. of resorcinol (previously dissolved in hot water) at the ordinary temperature.
V. Depth and tone unaltered; white material unchanged.	V. Four per cent Cellitazol ST, dyed, diazotized, and developed as given under 3, V.

10. Fastness to Cross Dyeing (Neutral Bath)

The dyed material, sewed into white union cloth, is treated for one hour, at bath ratio of 1:50, with 20% of calcined Glauber salt at 85° to 90° C., then rinsed and dried.

Standards	*Types*
I. Depth and tone strongly altered; strong bleeding upon white material.	I. One-half per cent Cellit Fast Yellow GGN. The dyestuff is dissolved in hot water, and the material dyed for 1 hour, at 70° C., at a bath ratio of 1:30, with the addition of 5% acetic acid of 30%, and 30% of calcined Glauber salt; then rinsed.
III. Depth and tone hardly altered; white material somewhat colored.	III. One per cent Cellitazol SR, dyed, diazotized, and developed as given under 9, III.
V. Depth and tone unaltered; white material uncolored.	V. Four per cent Cellitazol ST, dyed, diazotized, and developed as given under 3, V.

11. Fastness to Acids

The dyed material is spotted with a 1:10 solution of tartaric acid, and the alteration in tone estimated by comparison with a part spotted with water, the test to be made in both in the moist and the dry condition.

Standards	*Types*
I. Strong alteration in tone.	I. One per cent Cellit Fast Yellow R, dyed as given under 1, III.
III. Slight alteration of tone.	III. Five per cent Cellitone Fast Red Violet R Paste, dyed as given under 1, V.
V. No alteration of tone.	V. Four per cent Cellitazol ST, dyed, diazotized, and developed as given under 3, V.

12. Fastness to Scrooping

The dyed material is worked for five minutes in a bath of 3 g. of tartaric acid per liter of distilled water, at a bath ratio of 1:30, at the ordinary temperature, and dried without rinsing. The valuation of the color tone is to be made immediately after the scrooping.

Standards	*Types*
I. Strong alteration of the color-tone.	I. Five per cent Metachrome Orange 3R Double, dyed for 1 hour at 60° to 70° C., in a bath ratio of 1:30, with the addition of 30% calcined Glauber salt, then rinsed.
III. Slight alteration of the color-tone.	III. Three per cent Cellit Fast Red BB, dyed as given under 1, III.
V. No alteration of color-tone.	V. Four per cent Cellitazol ST, dyed, diazotized, and developed as given under 3, V.

13. Fastness to Chlorine

The test is made by two methods:

(a) The sample is plaited with the same amount of cotton, wetted out in warm water, and immersed for one hour, at about 15° C., in a freshly-prepared bath of sodium hypochlorite (1 g. of active chlorine per liter), then rinsed, soured, rinsed, squeezed, and dried.

(b) As given under (a), except that bleaching powder solution (1 g. of active chlorine per liter) is used in place of sodium hypochlorite.

Standards	*Types*
I. Treated according to (a) and (b); depth and tone strongly altered.	1. Four and one-half per cent Cellitone Blue Extra Paste, dyed as given under 1, V.
III. Treated according to (a); depth and tone not altered. Treated according to (b); depth and tone altered.	III. One per cent Cellitazol ORB, developed with 1.5% of phenol, dyed as given under 10, I, diazotized and developed as given under 9, III.
V. Treated according to (a) and (b); depth and tone not altered.	V. One-half per cent Cellitazol B, developed with 2.5% of Developer ON, dyed, diazotized, and developed as given under 4, V.

14. Fastness to Bleaching

The sample is plaited with wool, cotton, and chappe silk in such a manner that two parts of dyed material are present for each part of the undyed, and the whole bleached with hydrogen peroxide. The bleach bath is made up with 100 parts of distilled water and twenty parts of hydrogen peroxide of 10 to 12% by volume, and this bath is made very weakly alkaline with ammonia water. The bath must remain weakly alkaline during the bleaching (test with red litmus paper). The prepared material is laid into the bath at about 40° to 50° C., at a bath ratio of 1:40 to 1:50, and left in the slowly cooling bath for twelve hours. Care must be taken to keep the material always submerged in the bath, and to avoid strong agitation. The samples are then rinsed and dried.

Standards	*Types*
I. Depth and tone strongly altered; white material strongly colored.	I. One per cent Auramine O (493), dyed as given under 1, I.
III. Depth and tone little altered; white material somewhat colored.	III. Five per cent Cellitone Fast Red Violet R Paste, dyed as given under 1, V.
V. Depth and tone not altered; white material not colored.	V. Four per cent Cellitazol ST, dyed, diazotized, and developed as given under 3, V.

15. Fastness to Milling

The sample is plaited with cotton, wool, and silk, in the proportion of two parts of dyed to one part of undyed material, and so that each kind of fiber is in immediate contact with the dyed material. The sample is then treated at 30° C., at a bath ratio of 1:40, with a milling bath of 20 g. of Marseilles soap per liter of distilled water. It is first well worked with the hand, then left in for two hours, then thoroughly milled again by hand, washed, and dried.

Standards	*Types*
I. Rather strong degradation of the dyeing; white material rather strongly colored.	I. One per cent Methylene BGX (659), dyed as given under 1, I.
III. Depth and tone somewhat altered; white material somewhat colored.	III. Four and one-half per cent Cellitone Blue Extra Paste, dyed as given under 1, V.
V. Depth and shade not altered; no bleeding upon white material.	V. Four per cent Cellitazol ST, dyed, diazotized, and developed as given under 3, V.

16. Fastness to Potting

The dyed material is sewed into white woolen cloth, and treated for two hours in a 1:70 bath of distilled water at 90° C., then rinsed and dried.

Standards	*Types*
I. Depth and tone strongly altered; white wool strongly colored.	I. One per cent Cellit Fast Orange G, dyed as given under 1, III.
III. Depth and tone hardly altered; white wool only slightly colored.	III. One per cent Cellitazol RB, developed with 1.5% of phenol. One part of the dyestuff is dissolved in ten times the quantity of cold formic acid of 85%. After addition of boiling water, the dyestuff, which will have separated out in a finely divided state, is got into complete solution by addition of 0.8 liters of hydrochloric acid per 100 g. of dyestuff. The material is dyed in this bath without any other addition, then diazotized and developed as given under 9, III.
V. Depth and tone unaltered; white goods not colored.	V. One-fourth per cent Cellitazol B, developed with 1.5% of Developer ON, dyed, diazotized, and developed as given under 4, V.

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